APPENDIX A

Existing Stormwater Goals and Policies for the City of Lynnwood

EXISTING STORMWATER GOALS AND POLICIES FOR THE CITY OF LYNNWOOD

CITY OF LYNNWOOD COMMUNITY VISION

- To be a welcoming city that builds a healthy and sustainable environment.
    - Safe and walk-able interconnecting residential and commercial neighborhoods
    - Vibrant City Center
    - Promote Lynnwood as an affordable place to live, work, and play
    - Aesthetic neighborhood quality through code enforcement
    - Preserve and expand natural spaces, parks and cultural diversity and heritage
    - Integrate the built environment to support the natural environment
    - Encourage economic development
- To encourage a broad business base in sector, size and related employment, and promote high quality development.
    - Promote high quality, sustainable development and design (LEED)
    - Balanced commercial development
    - Convention center as an engine of economic growth and community events
    - Protect residential areas from commercial use
    - Communicate with the community on city plans, policies and events
- To invest in preserving and expanding parks, recreation, and community programs.
    - Develop a network of pedestrian and bike trails for recreation and transportation
    - Encourage business/organization partnerships and participation to create and promote community events
    - Create civic pride through cultural arts, events, parks and services

- Promote healthy lifestyles
- Provide diverse senior services creating a livable community
- Establish a new signature event that creates civic pride
- Use parks and cultural arts to attract economic growth

- To be a cohesive community that respects all citizens.
  - A safe, clean, beautiful, small-town atmosphere
  - Build and enhance a strong, diverse, integrated community
  - Develop and identify physical neighborhoods
  - Encourage citizens to be involved in community events
  - Engage our diverse population through effective, inclusive communication
  - Continue community communications and open process
- To invest in efficient, integrated, local and regional transportation systems.
  - Improve pedestrian and bike flow, safety, and connectivity
  - Adaptive, safe, well-maintained, state-of-the-art traffic management infrastructure
  - Support the needs of commuters and non-commuters
  - Reduce traffic congestion
- To ensure a safe environment through rigorous criminal and property law enforcement.
  - Continue to provide good quality response times for fire, paramedics, and police
  - Encourage support for police and fire department citizen volunteer programs
  - Become a benchmark city through technology and through neighborhood involvement
  - Increase police presence through more patrol and bike officers
  - Increase and support public education on public safety

- To be a city that is responsive to the wants and needs of our citizens.
    - Develop goals and objectives that benefit residents and businesses
    - Create/enhance Lynnwood's brand identity
    - Govern and grow in a way to stay true to the city's defined identity
    - Develop and execute a measurable strategic plan (budget, timeline); involve community
    - Fair and diverse revenue base
    - Promote Lynnwood's convenient location to maximize opportunities and benefits
    - Be environmentally friendly – sustainable

CITY OF LYNNWOOD COMPREHENSIVE PLAN

Capital Facilities Element

- Goal 1: Planning. Planning that considers both changes in regulations, requirements, and best available science, studies existing and future conditions and specifies nonstructural and structural solutions including system upgrades, maintenance and replacements based on established Level of Service (LOS) standards for the purpose of meeting future challenges as they arise.
    - Policy CF-1.1: Implement the requirements of the National Pollution Discharge and Elimination System (NPDES) and assess the areas in stormwater runoff management that require the City to make appropriate planning, regulatory, procedural or policy changes.
    - Policy CF-1.2: Update and adopt ordinances that meet the requirements of NPDES and Endangered Species Act (ESA) for water quality and quantity control from development and redevelopment.
    - Policy CF-1.3: Review and update the City's Comprehensive Flood and Drainage Management Plan approximately every 5 years, depending on changes in best available science and the regulatory climate.
    - Policy CF-1.4: Study and update the Surface Water Utility rates, and method of billing regularly to better reflect changes in surface water management, maintenance and operations, and capital project needs.

- Policy CF-1.5: Complete and implement an emergency response plan to be used for responding to surface and groundwater contamination emergencies.

- Goal 2: Maintenance and Operations (M&O). Continue to identify facilities that are in need of repair, cleaning, or replacement and revise the maintenance program to schedule these activities in an efficient, and timely manner so that the systems perform in a manner that will optimize the use and life of the facilities, while also making necessary changes in the program, as necessary, to protect the natural environment and aesthetic character of the city.

  - Policy CF-2.1: Operate the North Scriber Regional Detention Facility to decrease erosive and flood flows and to enhance environmentally sensitive areas in the Scriber Creek Drainage Basin.

  - Policy CF-2.2: Update and adopt ordinances that meet the requirements of the NPDES Phase 2 Municipal Permit for maintenance of the system by both the City of Lynnwood and private property owners.

  - Policy CF-2.3: Perform M&O activities to the currently adopted schedule such that cleaning, repairs, and replacements are made quickly and efficiently, or immediately in the case of emergencies.

  - Policy CF-2.4: Review and update the City's Comprehensive Flood and Drainage Management Plan list of problems and corrective solutions, depending on changes in best available science and the regulatory climate.

  - Policy CF-2.5: Every year prioritize, schedule, fund, and construct capital improvements in the Six-Year Capital Facilities Plan, as identified in the Comprehensive Flood and Drainage Management Plan, to decrease incidents of flooding, enhance water quality in the system, and make improvements to natural habitat.

- Goal 3: Interjurisdictional Relations. Cooperate and coordinate planning, capital facilities planning, and development, as appropriate, with adjacent jurisdictions and stakeholders for the purpose of improving levels of service and reducing costs for all services and utilities.

  - Policy CF-3.1: Participate in interjurisdictional coordination to help solve common stormwater runoff management problems, coordinate land use plans, development regulations and capital facility plans on a watershed basis.

  - Policy CF-3.2: Design and implement a Public Involvement Program that builds upon the current school grants program and expands to businesses as well as general citizen groups.

- Goal 4: Capital Facilities. Provide capital facilities to properly serve the community in a manner that enhances quality of life and economic opportunities, optimizes the use and protection of existing facilities and provides for future needs.
    - Policy CF-4.1: Implement levels of service (LOS) for water, sewer and stormwater systems as minimum standards for facility design and planning, land development permitting, and operation and maintenance.
    - Policy CF-4.2: Utilize professionally accepted methods and measures in determining LOS standards.
    - Policy CF-4.3: Land development review will include coordination of the development requirements according to pertinent adopted plans, the land development regulations, and the availability of system capacities needed to support such development.
    - Policy CF-4.4: Water, sanitary sewer, and stormwater system improvements shall be designed and constructed to the size required to serve the City's projected capacity needs consistent with the Comprehensive Plan.
    - Policy CF-4.5: Require the private sector to provide fair share, project-related capital facility improvements and contributions in connection with the development of land.
    - Policy CF-4.6: Development should be encouraged only when adequate utilities, including water, sewer, power, natural gas, telecommunications, and storm drainage facilities are available or will be made available in conjunction with development.
    - Policy CF-4.7: Implement capital facilities plans for water, stormwater, sewer, transportation, parks, recreation, public safety, and other municipal facilities.
    - Policy CF-4.8: Maintain a 20-Year Capital Facilities Plan that supports the Land Use Plan, and includes the implementation of a Six-Year Capital Facility Plan. Implement the following facility plans for City utilities, parks and recreation, and transportation facilities. These plans will be prepared and implemented such that they are coordinated and consistent with the Comprehensive Plan.
        - Six-Year Transportation Improvement Plan
        - Water Comprehensive Plan Update
        - Wastewater Comprehensive Plan
        - Surface Water Management Comprehensive Plan
        - Parks Plan
        - Non-Motorized Plan

- Transportation Business Plan

- Policy CF-4.9: Include the Six-Year Capital Facilities Plan and capital budget as a part of the annual budget process.

- Policy CF-4.10: Evaluate, categorize and prioritize proposed capital improvement projects in the Six-Year Capital Facilities Plan according to the following categories:

  - Category 1: Project specifically satisfies legal, operational, health, or safety requirements mandated by local, state, and federal statutes.

  - Category 2: Project is required to obtain basic services relating to public health, safety, welfare, and applicable levels of service (LOS) standards.

  - Category 3: Project is consistent with the Comprehensive Plan or other adopted Capital Facilities Plans.

  - Category 4: Project is a public benefit or service improvement relating to general welfare of the community.

- Policy CF-4.11: Requests for new capital facilities will be considered concurrently with requests for maintenance, repair, and staffing costs of existing capital investments.

- Policy CF-4.12: Identify acceptable funding methods and debt service standards as guidelines for financing capital facility and utility projects.

- Policy CF-4.13: Identify capital facility improvements and implementation strategies to encourage redevelopment at appropriate locations and for the Activity Center plans.

- Policy CF-4.14: Actively seek local, state, and federal funding and grants for the capital facilities projects.

- Policy CF-4.15: Amend the following capital facility plans as necessary to include current regulations, standards, techniques and conditions. In addition, comprehensively review and revise these plans at least every 5 years. Revisions, updates and amendments to the plans shall be consistent with the City's Comprehensive Plan.

  - Six-Year Transportation Plan

  - Water Comprehensive Plan Update

  - Wastewater Comprehensive Plan

  - Surface Water Management Comprehensive Plan

  - Parks Plan

  - Non-Motorized Plan

- Transportation Business Plan

- Policy CF-4.16: Ensure that existing capital facilities are maintained and operated in a manner that will optimize the use and life of the facility.
- Policy CF-4.17: Capital improvements needed to maintain and improve existing facilities shall be prioritized in the capital facilities plans.
- Policy CF-4.18: Develop environmentally responsible strategies and standards for capital facilities.
- Policy CF-4.19: Design and develop capital facilities that minimize or mitigate adverse impacts.
- Policy CF-4.20: Develop, operate, and maintain capital facilities located in neighborhoods to minimize or mitigate facility related impacts on residential uses.
- Policy CF-4.21: Capital facility improvements and maintenance should be compatible with the natural constraints of slope, soil, geology, vegetation, wildlife habitat, and drainage.
- Policy CF-4.22: Evaluate capital projects, plans, and programs to determine their impact to locally significant historical resources.
- Policy CF-4.23: Coordinate capital facilities planning and development with appropriate jurisdictions and service providers.
- Policy CF-4.24: Work closely with other jurisdictions and service providers to ensure the proper extension or expansion of utility services.
- Policy CF-4.25: Encourage the county, federal, and state, regional, and special purpose agencies to participate in the implementation of capital facilities that are mutually beneficial.
- Policy CF-4.26: Work with the appropriate jurisdictions and agencies to coordinate stormwater management activities.
- Policy CF-4.27: Facilitate efficient and equitable siting of essential public facilities.
- Policy CF-4.28: Ensure that the siting and construction of capital facilities considered essential public facilities are not precluded by the City's Comprehensive Plan.
- Policy CF-4.29: Establish a review process for the siting and construction of essential, local public facilities.
- Policy CF-4.30: Participate in an interjurisdictional review and selection process for the siting of essential public facilities having interjurisdictional significance.

- Policy CF-4.31: Locate and develop essential public facilities to provide the necessary service to the intended users of the facility with the least impact on surrounding land uses.

- Policy CF-4.32: The City has standards for the design and construction of sewer water and stormwater utilities, and programs to develop new or expand utility systems. These standards should include the most recent design techniques so that these utilities are constructed and operate in an efficient manner.

- Policy CF-4.33: Design and construct sewer, water, and stormwater utility systems to ensure efficient service, and the use of best management practices.

- Policy CF-4.34: Require connection to the City sewer system for all new development.

- Policy CF-4.35: Design sewer systems to provide efficient and reliable service while minimizing cost. Gravity feed shall be used whenever feasible.

- Policy CF-4.36: Continue to actively pursue elimination of high infiltration and inflow situations.

- Policy CF-4.37: Support and implement conservation strategies aimed at reducing average annual and peak day water use. These strategies can include billing rate structures that encourage conservation, water restrictions at appropriate times, technical assistance for leak detection, design of low-water use irrigation and other water saving measures, public information, use of drought tolerant plantings and native vegetation in City landscaping and development regulations, and construction codes requiring water saving devices.

- Policy CF-4.38: Design water delivery and storage systems to provide efficient and reliable service while minimizing cost. These design methods can include the use of gravity feed whenever feasible, the development of a looped system, and standardization of transmission facilities sizing and/or materials.

- Policy CF-4.39: New development shall construct water system improvements and dedicate easements necessary to serve the development and to provide a reliable integrated distribution system.

- Policy CF-4.40: Maintain adequate water storage facilities to meet demand loads.

- Policy CF-4.41: Open channel drainage systems, natural or manmade (except roadway drainage ditches), should be retained and new systems encouraged and utilized when feasible.

- Policy CF-4.42: Stormwater management systems shall be designed and constructed to minimize adverse impacts to natural watercourses.

- Policy CF-4.43: Stormwater retention/detention facilities shall be allowed to be used as partial fulfillment of open space requirements.
- Policy CF-4.44: Encourage co-location of utilities in shared trenches and easements.
- Policy CF-4.45: Coordinate utility construction with public improvements when possible to minimize costs and related service disruption.
- Policy CF-4.46: Require underground utilities for all new development.
- Policy CF-4.47: Require, where feasible, that existing utility lines be relocated underground when areas are redeveloped, or as streets are constructed, reconstructed, or widened.
- Policy CF-4.48: Promote, where safe, the joint use of utility corridors for recreational facilities, such as non-motorized trails.
- Policy CF-4.49: Design utility facilities that are aesthetically complementary to surrounding land uses and minimize adverse visual impacts.

Land Use Element

- Goal: The scale, character, and configuration of land uses throughout Lynnwood will preserve and protect existing residential neighborhoods, protect environmentally sensitive areas, support physical activity and public health, minimize the threat of natural and manmade hazard, promote commerce and business, and accommodate population and employment growth.
  - Policy LU-6: Land use policies and regulations should, where feasible, utilize natural physical features, such as streams, hillsides, or stormwater basins as the boundary between differing land use designations and zones.

Environmental Element

- Goal ER-1: Environmental Protection and Enhancement: Be a city government that strives to improve, protect, or when unavoidable, reduce impact to the natural environment, consider impacts of policies on the natural environment, and lead educational programs about the natural environment.
  - Policy ER-1.1: Meet all state and federal mandates regarding stormwater and critical areas.
  - Strategy ER-1.1: Ensure City government operations comply with applicable regulations.

- Strategy ER-1.2: Evaluate the environmental impacts of proposed regulations.
- Strategy ER-1.3: Consider and integrate best available science in development regulations that are concerned with critical areas.
- Strategy ER-1.4: Promote and coordinate educational programs to raise public awareness of environmental issues, encourage respect for the environment, and show how individual actions and the cumulative effects of a community's actions can have significant effects on the environment.
- Strategy ER-1.5: Cooperate with other local governments, state, and federal agencies, tribal entities, and nonprofit organizations to protect and enhance the environment.

- Goal ER-2: Conservation of Resources and Recycling: Be a city government that strives to reduce consumption of resources, minimizes waste, reduces pollution, and promotes conservation.
  - Policy ER-2.1: Recycle and conserve resources.
  - Strategy ER-2.1: Design, construct, and operate City facilities to maximize efficiency and conservation opportunities, limit waste, and prevent unnecessary pollution.
  - Strategy ER-2.2: Minimize the materials used and waste generated from City facilities.
  - Strategy ER-2.3: Use, where feasible, new technologies that demonstrate ways to reduce environmental impacts.
  - Strategy ER-2.4: Promote energy and water conservation.
- Goal ER-3: Natural Landscape and Vegetation: Retain existing vegetation, soils, and natural landscape to the maximum extent feasible.
  - Policy ER-3.1: Preserve trees, topsoil, and native vegetation.
  - Strategy ER-3.1: Encourage land development practices that minimize disturbance to vegetation, retain native soils, and retain the natural landscape. Avoid disturbance of steep slopes where the erosion potential and opportunity for landslides meets protection guidelines.
  - Strategy ER-3.2: Ensure prompt stabilization of soil after grading and vegetation removal.
  - Strategy ER-3.3: Retain trees through application and enforcement of the City's Tree Regulations.

- Strategy ER-3.4: Avoid clearing of native vegetation that contributes to slope stability, reduces erosion, shades shorelines, buffers wetlands and stream corridors, and provides aquatic habitat.

- Strategy ER-3.5: Encourage the incorporation of open space into development through setbacks, view corridors, and recreation areas. Preserve areas with natural or scenic value within development sites to achieve open-space amenities.

- Strategy ER-3.6: Encourage the use of Low Impact Development Techniques where feasible.

- Goal ER-4: Geologic Hazard Areas: Protect geologic hazard areas including steep slopes with significant landslide or erosion potential, soils unsuited to development, and areas of significant seismic hazard.

  - Policy ER-4.1: Enforce the Geologically Hazardous Areas provisions of the Critical Areas Regulations.

  - Strategy ER-4.1: Manage development in geologic hazard areas to minimize erosion and landslide probabilities during both construction and use.

- Goal ER-5: Water Resources: Improve water quality and protect wetlands, natural streams and lakes, riparian vegetation, and buffers; reduce point and non-point source pollution.

  - Policy ER-5.1: Review and update, as necessary and as required by state and federal mandate, the City's Critical Areas Ordinance to ensure protection of known critical areas using the best available science.

  - Strategy ER-5.1.1: Enforce and apply the City's Critical Areas Regulations.

  - Strategy ER-5.1.2: Seek to preserve wetlands and stream corridors as open space.

  - Strategy ER-5.1.3: Ensure that no net-loss of wetlands occurs within the city. If impacts are unavoidable, ensure that those impacts are the least amount practicable, and that an area equal to or larger be provided as compensation for the loss.

  - Strategy ER-5.1.4: Enhance and/or encourage restoration of degraded wetlands where possible.

  - Strategy ER-5.1.5: Adopt and enforce regulations to protect identified Critical Aquifer Recharge Areas.

  - Strategy ER-5.2: Implement provisions of the NPDES Phase II Municipal Permit

- Strategy ER-5.2.1: Implement practices to minimize stormwater impacts associated with the use of pesticides on City-owned property, and provide education for other landowners to do the same.

- Strategy ER-5.2.2: Protect and enhance surface water quality through development regulations, education and outreach, and effective maintenance and operations.

- Strategy ER-5.2.3: Encourage Low Impact Development stormwater treatment technologies in the development of roadways, parking lots, public plazas, sidewalks, and pathways where practicable.

- Strategy ER-5.2.4: Support and promote public education to protect and improve surface and groundwater resources by: increasing the public's awareness of potential impacts on water bodies and water quality; encouraging proper use of fertilizers and chemicals on landscaping and gardens; encouraging proper disposal of materials; educating businesses on surface and groundwater protection best management practices in cooperation with other government agencies and other organizations; educating the public and businesses on how to substitute materials and practices with a low risk of surface and groundwater contamination for materials and practices with a high risk of contamination.

- Strategy ER-5.2.5: Encourage development practices that integrate and preserve the city's watercourses and wetlands.

- Goal ER-6: Fish and Wildlife: Protect urban forests and wildlife habitats, including salmon habitat as feasible, and in balance with the requirements of an urban area.

  - Policy ER-6.1: Maximize, as feasible, fish and wildlife habitat.

  - Strategy ER-6.1: Where suitable habitat potential exists, work to maintain and enhance that habitat.

  - Strategy ER-6.2: Comply with the Endangered Species Act.

  - Strategy ER-6.3: On City property, both on-land and in-water, cultivate native ecosystems that encourage native wildlife and encourage removal of invasive, nonnative vegetation.

  - Strategy ER-6.4: Assist private property owners in maintaining the health of natural habitats on their property through a combination of education, incentives, and development review practices.

  - Strategy ER-6.5: Encourage environmental protection and enhancement practices among Lynnwood's residents and City personnel through education, training, and continued volunteer participation in the care of Lynnwood's plant and wildlife

habitats. Involve citizens, community groups, and nonprofit organizations in the care and enhancement of the urban forests and wildlife habitat.

- Strategy ER-6.6: Consider best available science in making decisions regarding habitat preservation and restoration efforts.

- Goal ER-7: Urban Forestry: Support a robust and healthy, appropriate tree canopy including sizable tree clusters, as well as native trees.
  - Policy ER-7.1: Implement the City's tree protection and preservation regulations and monitor and update these regulations as necessary.
  - Strategy ER-7.1: Strive to achieve a net increase of healthy, diverse tree cover throughout the city by requiring developers to save trees worthy of retention and to replant appropriate species for the urban environment at a ratio of at least one tree planted for every tree removed.
  - Strategy ER-7.2: To help preserve the natural environment and Lynnwood's remaining forested lands, Lynnwood shall promote the retention of sizable tree clusters, forested slopes, treed gullies, and specimen trees that are of species that are long-lived, not dangerous, well-shaped to shed wind, and located so that they can survive within a development without other nearby trees.
  - Strategy ER-7.3: Street trees within street right-of-way shall be encouraged along appropriate arterial streets and local streets.
  - Strategy ER-7.4: Street trees shall be allowed to be planted in planter strips or tree wells located between the curb and sidewalk, where feasible. Tree species and planting techniques shall be appropriate for the street.
  - Strategy ER-7.5: On City property, protect selected trees, utilize proper pruning and tree care, and improve conditions in order to achieve long-term benefits from the urban forest—and encourage private landowners to do the same.
  - Strategy ER-7.6: Lynnwood should provide information to community residents and property owners to encourage them to plant appropriate trees on their properties and to care for the trees properly.
  - Strategy ER-7.7: Continue to encourage planting trees through the distribution of the Tree Voucher program.

- Goal ER-8: Air Quality: Raise Lynnwood's level of livability by supporting efforts to reduce urban environmental air pollution. Increase usage of electricity and biofuel in City fleet vehicles and construction equipment to reduce associated air pollution.

CITY OF LYNNWOOD MUNICIPAL CODE

- Surface water is discussed in Chapter 13.35: Surface Water Utility of the Lynnwood Municipal Code.

  The City finds and declares:

  A. All real property in the city contributes runoff to the common surface water problem, and all real property in the city benefits from the surface water utility of the City.

  B. The development of real property, as measured by the square footage of impervious surface area, is an appropriate basis for the determination of an individual parcel's contribution to the problem of surface water runoff.

  C. The establishment of the surface water utility is necessary to avoid and abate public nuisances (Ordinance 2045 § 4, 1995; Ordinance 1813 § 1, 1991).

- Chapter 13.40: Stormwater management:

  The City Council finds that this chapter is necessary to: promote sound development policies and construction procedures that respect and preserve the city's watercourses; minimize water quality degradation; prevent sedimentation of creeks, streams, ponds, lakes and other waterbodies; protect the life, health, and property of the general public; preserve and enhance the suitability of waters for contact recreation and fishing; preserve and enhance the aesthetic quality of the waters; maintain and protect valuable groundwater resources; minimize adverse effects of alterations in groundwater quantities, locations, and flow patterns; ensure the safety of City roads and rights-of-way; decrease drainage-related damage to public and private property; and avoid or abate public nuisances. This chapter is also necessary to control stormwater runoff generated by development, redevelopment, construction sites, or modifications to existing stormwater systems that directly or indirectly discharge to the City stormwater system, in a manner that complies with the Western Washington Phase II Municipal Stormwater Permit issued by the Department of Ecology (Ordinance 2833 § 2, 2010).

- Chapter 13.35: Surface Water Quality:

  The purpose of this chapter is to protect the city's surface and groundwater quality by providing minimum requirements for reducing and controlling the discharge of contaminants. The City Council recognizes that water quality degradation can result either directly from one discharge or through the collective impact of many non-point source discharges. Therefore, this chapter prohibits the discharge of contaminants into surface and stormwater and groundwater, and outlines preventive measures to restrict contaminants from entering such waters. These measures include education, source

control, implementation of best management practices (BMPs), as well as enforcement, amongst others (Ordinance 2834 § 1, 2010).

SOURCES

<http://www.ci.lynnwood.wa.us/Assets/Departments/Community+Development/Comprehensive+Plan/2015/Final/Comp+Plan.pdf>, pages 8, and 165–178.

<http://www.ci.lynnwood.wa.us/Assets/Departments/Parks/Outreach/Visioning+Lynnwood/Visioning+Reports/1st+Visioning+Report/Visioning_Report_Initial.pdf>, page 24.

<http://www.codepublishing.com/WA/Lynnwood/#!/lynnwood13/Lynnwood1345.html#13.45.005>.

APPENDIX B

City of Lynnwood Drainage Characteristics

CITY OF LYNNWOOD DRAINAGE CHARACTERISTICS

Several drainage basins are located within the City of Lynnwood. Each basin is described below, including basin size, urban development, and drainage and water quality issues in receiving water bodies. Drainage basin sizes and areas located within the City of Lynnwood were determined using geographic information system (GIS) data. A general description of the City's soils and geology, groundwater, topography and slope, and climate is also provided.

DRAINAGE BASIN DESCRIPTIONS

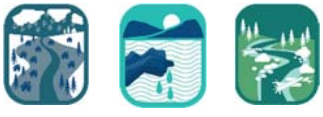
Scriber Creek Drainage Basin

The Scriber Creek basin is a subbasin of the Swamp Creek drainage basin and the largest drainage basin in the City, comprising an area of approximately 3,000 acres. Approximately 74 percent of the Scriber Creek basin is within the city limits.

The upper reaches of Scriber Creek are located near 164th Street SW in the northern portion of the city. The stream has a low gradient in this headwater area. In the upper basin areas, large sections of the stream are piped, and open channel reaches are lined with riprap for bank armoring where the stream parallels State Route (SR) 99, passing through a variety of low-, medium-, and high-density residential areas and numerous commercial areas.

Scriber Creek crosses SR 99 near 186th Place SW before flowing through residential developments between 188th Street SW and 196th Street SW. After passing under 196th Street SW, the stream flows into Scriber Lake. Scriber Lake is a bog lake with the main body of water separated from the north lagoon by a floating wedge of peat. The entire water area is approximately 3.3 acres and the main lake has a maximum depth of 6.7 meters. Scriber Creek then flows southeast from Scriber Lake through a box culvert under the intersection of 200th Street SW and 50th Ave SW and crosses Interstate 5 (I-5) near 204th Street SW in a long culvert. Downstream of I-5, Scriber Creek combines with Poplar and Golde Creeks before eventually discharging to Swamp Creek near the intersection of Cypress Way and Locust Way.

Scriber Creek



Urban development along with undersized culverts and channelized, straightened banks within Scriber Creek has resulted in flooding problems in public rights-of-way, over arterial and

residential streets, and within private property. Scriber Creek is typical of many small urban streams, with extreme summer low flow conditions and intermittent flooding during the wet fall and winter months (FEMA 2005). In addition to flow control problems experienced by Scriber Creek, water quality and salmon habitat are also parameters of concern. Scriber Creek is listed on Ecology's 303(d) list for low biological integrity scores (Ecology 2019). Fall Chinook salmon (*Oncorhynchus tshawytscha*) presence and coho salmon (*O. kisutch*) spawning is documented in the lower reach (east of I-5) of Scriber Creek (WDFW 2019a). An impassable barrier consisting of two round PVC overflow pipes with beaver deceiver wire cages through a beaver dam in a large wetland area southeast of exist 181A near I-5 prevents fish access to the upper reaches of Scriber Creek (WDFW 2019b).

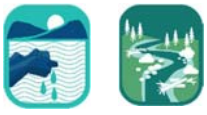
Scriber Lake

The watershed surrounding the Scriber Lake is heavily urbanized and the lake functions as part of the city's stormwater system, receiving high sediment loads and runoff from the upstream portions of Scriber Creek. The high levels of sediment, nutrients, and pollutants have caused the lake to become eutrophic (Lynnwood 2005), resulting in increased aquatic plant life and decreased aquatic species, such as fish. Scriber Lake is listed on Ecology's 303(d) list for phosphorus exceedance (Ecology 2019) and received alum treatment in April 2016 (Snohomish County 2017). Although Scriber Lake historically supported healthy salmonid populations, the lake is no longer ideal salmonid habitat due to limited or blocked fish passage, water quality problems, and high water temperatures (Lynnwood 2005).

Swamp Creek Drainage Basin

The Swamp Creek basin is located in the Lake Washington watershed. The total basin size is approximately 160,000 acres or 25 square miles (Snohomish County 2002a). Scriber Creek drains the western portion of the watershed. Approximately 190 acres of the Swamp Creek basin are located within city limits, though most of this area has been categorized as Tunnel Creek, Golde Creek, Poplar Creek, and Scriber Creek drainage basins. South of the city, the Swamp Creek basin includes small portions of the Cities of Brier, Bothell, and Kenmore. Swamp Creek ultimately discharges to the Sammamish River, approximately 0.5 miles east of Lake Washington.

Swamp Creek



Swamp Creek provides spawning habitat for fall Chinook, coho and sockeye salmon (*O. nerka*), and has winter steelhead (*O. mykiss*) documented presence (WDFW 2019a). Water quality and fish passage are the primary concerns in Swamp Creek. A Total Maximum Daily Load (TMDL)

water quality improvement report and implementation plan (Ecology 2006) was prepared for Swamp Creek to address elevated concentrations of fecal coliform bacteria. Potential pollution sources include stormwater outfalls contaminated with pet waste, small area farms, and leaking septic tanks (Ecology 2006). The TMDL involves cooperation from several other jurisdictions including Snohomish County, Mountlake Terrace, Everett, Kenmore, Bothell, and Brier. Swamp Creek is also listed on Ecology's 303(d) list for exceedances in temperature and dissolved oxygen (Ecology 2019), which are currently not part of the TMDL.

The amount of water in Swamp Creek varies depending on the season and amount of precipitation. During the summer, parts of Swamp Creek may run dry, and when present, summer flows are low and create fish passage barriers for adult salmonids (Ecology 2006). In the winter, base flow averages around 35 cubic feet per second (cfs) but can increase to over 350 cfs during rain events (Ecology 2006). In addition to flow-related fish passage barriers, Swamp Creek has several culverts that have been corrected to improve fish passage, including a culvert replacement on 23rd Place West in 2003, a culvert and fishway replacement under a private driveway off Butternut Road in 2006, and a culvert and fishway replacement under I-5 in 2007 (WDFW 2019b).

Perrinville Creek Drainage Basin

The Perrinville Creek drainage basin is approximately 920 acres in size and is located in northern Edmonds and the southwestern portion of Lynnwood. Approximately 48 percent (438 acres) of the basin area is within city limits.

The upper reaches of Perrinville Creek are located near the intersection of Olympic View Drive and 76th Avenue W. Several small tributary drainages are located in the upper reaches of the basin, where the stream flows northwest through a series of low and medium-density residential areas. The gradient of Perrinville Creek steepens approximately 1 mile from the Puget Sound, where the stream drops 400 feet in elevation. The lower reaches of Perrinville Creek are dominated by the heavily forested Snohomish County Park, with minor amounts of low-density residential developments surrounding the park. The stream then crosses under Talbot Road and the Burlington Northern Santa Fe Railway tracks before discharging to the Puget Sound at Browns Bay.

Perrinville Creek

Perrinville Creek supports resident cutthroat trout upstream of Talbot Road, and lower reaches support anadromous fish, mainly coho salmon (Herrera 2012). The watershed was largely developed prior to modern stormwater quantity and quality controls. Flooding and erosion, water quality, and impaired habitat are the primary concerns in Perrinville Creek. Water quality and aquatic habitat in Perrinville Creek are impaired due to high flows that are causing erosion

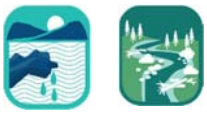
in the upper reaches and sedimentation and some flooding in the lower reaches. Ecology has not measured water quality, sediment, or bioassessment parameters in Perrinville Creek.

Hall Creek Drainage Basin

The Hall Creek drainage basin comprises approximately 2,263 acres. This basin is bordered by the Scriber Creek basin to the northeast and the Perrinville Creek basin to the northwest. The southwest portion of the city contains the headwaters of this basin. Approximately 16 percent of the basin is located within the City limits. Most of the Hall Creek basin is located south of the City limits.

In its upper reaches, the Hall Creek channel has a low gradient. Development in the upper portion of the Hall Creek basin is characterized by low and medium-density residential areas with several light industrial areas. The western portion of the basin includes the Edmonds Community College campus and the Lynnwood Municipal Golf Course. The central portion of the basin is dominated by commercial development associated with the SR 99 corridor. Hall Lake, located in the northeastern portion of the Hall Creek basin just inside Lynnwood city limits, collects drainage from 135 acres within the City limits. Hall Creek flows west out of Hall Lake before heading south, ultimately discharging to Lake Ballinger.

Hall Creek



Hall Creek is the main surface water inlet to Lake Ballinger. In the early 1980s, portions of Hall Creek were restored by constructing two sedimentation ponds and revegetating and regrading the stream channel to reduce sediment and phosphorus loading into Lake Ballinger (KCM 1986). Since the restoration actions, suspended sediment levels, nutrient loads, and dissolved oxygen within Hall Creek have improved; however, Hall Creek continues to have issues with water quality and is listed on Ecology's 303(d) list for exceedances in fecal coliform bacteria (Ecology 2019).

Hall Creek also has issues with flooding and conveyance capacity along the length of the creek, especially at 212th Street SW in Mountlake Terrace (Otak 2009). Coho salmon use the lower reaches of Hall Creek for rearing habitat (WDFW 2019a). Partial barriers along 228th Street SW, a culvert between 224th Street SW and 220th Street SW, and north of 220th Street SW may prevent further access and habitat use (WDFW 2019b).

Hall Lake

Hall Lake is a privately-owned lake with the lakeshore consistently entirely of residential dwellings. The surrounding watershed is highly urbanized and receives runoff from industrial areas, highways, and a freeway. The lake has been characterized as eutrophic (Mountlake Terrace 2018).

Aquatic habitat is the primary concern in Hall Lake due to the lack of riparian vegetation and presence of invasive species in the lake. Riparian tree cover along the lakeshore is lacking and there is generally no buffer between landscaped yards and the lake. As a result, solar heating of the lake is greater than it would be with a forested riparian zone, and lawn chemicals are more likely to enter the lake than if a buffer of natural vegetation were present between residences and the lake. An aquatic plant survey in Hall Lake documented the presence of variable-leaf milfoil (*Myriophyllum heterophyllum*), a class A noxious weed in Washington State (Mountlake Terrace 2018), a designation that mandates the eradication of the species. Variable-leaf milfoil is a fast-growing aquatic plant that forms dense mats which clog waterways and out-compete native plants.

Lake Ballinger

The shoreline along Lake Ballinger is dominated by single family dwellings and two golf courses and has several stormwater outlets that contribute to the inflow to the lake. The lake receives considerable stormwater runoff during rain events, primarily from the urban areas in Lynnwood, Edmonds, Mountlake Terrace, and norther King County. Water quality has been an issue in Lake Ballinger for more than 30 years. Since 1970, numerous water quality reports and restoration actions have been used to improve the condition of the lake. Lake Ballinger is also listed on Ecology's 303(d) list for exceedances in fecal coliform bacteria (Ecology 2019). Despite the installation of a hypolimnetic withdrawal system and alum treatments, Lake Ballinger continued to struggle with phosphorus levels and in 1993, Ecology developed a TMDL for dissolved phosphorus. A study on the effectiveness of the TMDL in 2006 revealed that phosphorus levels were not increasing; however, unwanted algae growth continues to affect recreational and aesthetical uses of the lake (Otak 2009).

In recent years, a dense growth of aquatic invasive plants in Lake Ballinger has negatively impacted the aquatic habitat in the lake (Mountlake Terrace 2018). In June 2018, an aquatic plants survey documented fragrant water lily (*Nymphaea odorata*), Eurasian milfoil (*Myriophyllum spicatum*), and curly leaf pondweed (*Potamogeton crispus*) (Mountlake Terrace 2018). Snohomish County has designated Eurasian milfoil a class B noxious weed, requiring

control efforts. Fragrant water lily and curly leaf pondweed are class C noxious weeds in Washington State and do not require control efforts.

Flooding is also a major issue around Lake Ballinger. During large storm events, many of the homes and yards adjacent to Lake Ballinger experience some flooding. Lake levels are controlled with an outlet weir that along McAleer Creek to Lake Washington. In 2008, the jurisdictions around Lake Ballinger formed The Hall Lake, Hall Creek, Chase Lake, Echo Lake, Lake Ballinger, and McAleer Creek Watershed Forum (the Forum). The Forum includes representatives from the City of Edmonds, City of Lake Forest Park, City of Lynnwood, City of Mountlake Terrace, City of Shoreline, and Snohomish County. Using grant money from the State Legislature, the Forum hired a team of consultants to develop a strategic action plan for the watershed, which includes specific actions and projects to address specified water resource issues.

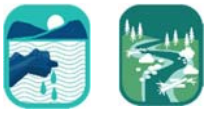
Historically, Lake Ballinger was likely home to significant salmonid populations, including Chinook salmon and coho. Loss of viable habitat through general development pressures, in-stream barriers to migration, and high flow levels that damage redds or spawning sites has led to the decline and near elimination of most runs in the Puget Sound region (Shaw 2014). Development pressure contributes to the loss of viable habitat and results in higher stream flows with higher pollutant loads during storm events, further damaging salmon populations (Shaw 2014). Coastal cutthroat trout are now the most viable fish species in the lake (Shaw 2014).

Golde Creek Drainage Basin

The Golde Creek drainage basin comprises approximately 875 acres and is located in the eastern portion of the City. Approximately 45 percent of the basin is located within city limits. The Golde Creek basin is bordered by the Poplar Creek basin to the west, the Tunnel Creek basin to the north, and the Swamp Creek basin to the east.

Golde Creek flows from north to south. Development in the headwater areas of the basin is dominated by the Alderwood Mall. The existing drainage system in this area is a network of pipes that direct flow to the south under I-5. Golde Creek continues south through a series of commercial developments south of I-5. Development in the lower reaches of the basin is primarily low to medium-density residential areas. Golde Creek ultimately flows into Scriber Creek in Brierwood Park.

Golde Creek



Although Golde Creek does not provide high quality salmonid rearing or spawning habitat for the salmonids of Swamp Creek, a few rearing juvenile salmonids are occasionally observed using the channel (Lynnwood 2000). Water quality is the primary concern and Golde Creek is listed on

Ecology's 303(d) list (as an unnamed tributary to Swamp Creek) for exceedances in temperature and dissolved oxygen, and for degraded biological integrity (Ecology 2019). Golde Creek is a potential source of fecal coliform bacteria in Swamp Creek and is part of the Swamp Creek TMDL (Ecology 2006).

Poplar Creek Drainage Basin

The Poplar Creek basin is 230 acres in size and is located in the eastern portion of the city. Approximately 54 percent of the basin is located within the city limits. The Poplar Creek basin is surrounded by the Scriber Creek basin to the west and the Golde Creek basin to the east.

Poplar Creek flows from north to south. The development in the northern portion of the basin is characterized by medium-density residential. As the stream flows south, it passes through a series of commercial areas before flowing under I-5. After passing under I-5, Poplar Creek continues flowing south, where the development is characterized primarily by low-density residential. Poplar Creek ultimately discharges to Scriber Creek south of the intersection of Larch Way and Poplar Way.

Tunnel Creek Drainage Basin

The Tunnel Creek drainage basin is approximately 300 acres in size and is part of the Middle Swamp Creek subbasin. Ninety-four percent of the basin area lies within the northeastern portion of the City limits.

Development in the Tunnel Creek basin is primarily single-family residential, but also includes Lynnwood High School and portions of SR 525. The basin has a high gradient near the headwaters, and the stream channel has a low gradient near SR 525 and the confluence with Swamp Creek. Tunnel Creek flows through a culvert under SR 525, then under Maple Road, and ultimately discharges downstream of the control structure of the Swamp Creek Regional Detention Basin, located in Swamp Creek approximately 100 feet upstream of the Swamp Creek crossing of Maple Road.

Lund's Gulch Creek Drainage Basin

The Lund's Gulch Creek drainage basin is approximately 1,440 acres in size and is located north of the city. A small portion of the basin (13 percent) is located within the City limits.

Development in the headwater areas of the Lund's Gulch Creek basin consists of commercial land use along the SR 99 corridor and suburban residential neighborhoods. The existing drainage system in the upper watershed is a network of pipes and ditches that collect and convey stormwater runoff to the stream. In the lower basin, the stream flows through a steep, heavily forested ravine and ultimately discharges to the Puget Sound.

Meadowdale Glen Infiltration Ponds Drainage Basin

The Meadowdale Glen Infiltration Ponds drainage basin (Meadowdale basin) is approximately 270 acres in size. Approximately 80 percent of the Meadowdale Pond basin is located within the northwestern portion of the City limits.

Development in the Meadowdale basin is characterized by the Meadowdale Playfield area, several low to medium-density residential areas, and several small areas of forested land. The Meadowdale basin is a terminal basin and doesn't contribute surface runoff to any other basins. All the drainage from this area passes into large infiltration ponds (Meadowdale Glen Infiltration Ponds) maintained by the City of Lynnwood.

Puget Sound Drainage Basins

Approximately 600 acres in the western portion of the city drain to the Puget Sound through unnamed tributaries. The development in these basins is dominated by low and medium-density residential areas. In general, the unnamed tributaries flow from east to west.

Soils and Geology

Glacial till soils cover the majority of the City (NRCS 2008). Till soils are moderately well-drained with low infiltration capacity and overlie a relatively impermeable hardpan layer. Infiltration through the hardpan typically ranges between 6 and 18 inches per year (Snohomish County 2002a). Till soils are highly consolidated and not particularly erosive. Small areas of wetland soils are present in the City, including along the Scriber Creek corridor between its confluence with Swamp Creek and Scriber Lake. Wetland soils are typically very dense, due to high concentrations of organic matter, and typically have low infiltration rates. Small areas of glacial outwash soils are also present in the city. Outwash soils are highly permeable and generate low runoff rates.

Groundwater

Groundwater storage in the Puget Sound lowlands typically occurs in outwash deposits confined by layers of till. The primary aquifer in the south Snohomish County area is a Vashon advance outwash deposit underlying the Intercity plateau (Snohomish County 2002a). For the drainage basins that discharge runoff to the Puget Sound, including Lund's Gulch Creek, the Puget Sound basins, and Perrinville Creek, groundwater discharges commonly occur from the aquifer along the boundary between the Esperance Sand and Whidbey Formation units (Snohomish County 2002b). The groundwater discharges are expressed as seeps and springs on cliff faces, ravine slopes, and in drainage channels.

TOPOGRAPHY AND SLOPE

A large portion of the city lies on the Intercity plateau, an upland glacial plateau between the Puget Sound and the Snohomish River. Ground slopes in this area are low to moderate, trending from north to south. Elevation ranges from 400 to 600 feet above sea level on much of the Intercity plateau. Steeper slopes are encountered in the basins described above that discharge to the Puget Sound, where perennial channels and most of their tributary channels are situated in narrow, deeply incised V-shaped ravines (Snohomish County 2002b).

CLIMATE

The climate in the City of Lynnwood is typical of the Puget Sound lowlands, located west of the Cascade Mountains, and is strongly influenced by the Pacific Ocean. Winters are rainy and mild, with average temperatures between 30 and 50 degrees Fahrenheit (°F). Summers are generally dry and moderately warm due to warm Pacific high pressure that typically dominates the region, with higher temperatures approaching 80°F. The mean annual precipitation is about 37 inches in Lynnwood (see Table A-1). Approximately 79 percent of this precipitation (29 inches) falls between October 1 and April 30 in a typical year, although large storms may occur throughout the year.

Table A-1. Average monthly and annual precipitation at Lear Lynnwood from 1981 - 2010. (NOAA 2019).

Month	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug	Sept.	Oct.	Nov.	Dec.	Total
Average Annual Precipitation (inches) [a]	4.45	3.32	3.44	2.68	2.22	1.84	0.88	1.01	1.61	3.34	6.13	5.34	37.26

[a] Precipitation averages based on data collected at stations in Everett, WA and Seattle, WA (NOAA 2019).

Climate Change Predictions

Significant research on climate change predictions has been conducted by the Climate Impacts Group (CIG) at the University of Washington. This research projects the local effects of global climate change using 20 global climate models and two greenhouse gas emissions scenarios. Local climate impacts are identified by downscaling model results and supplementing data with regional climate models.

Some general, stormwater-related predictions for the Puget Sound area for the next 50 years are listed below (Mauger et al. 2017):

- There are no statistically significant trends toward changes in average annual precipitation.

- Future occurrences of heavy rainfall are projected to be more frequent and more intense and will exacerbate flooding in many areas.
- Seasonal, year-to-year, and decade-to-decade variations will remain an important feature of local climates.
- There is a projected increase in landslide risk, erosion, and sediment transport during wetter months.

Table A-2 summarizes CIG's most recent climate change predictions for the watershed that contains the Lynnwood area (Mauger et al. 2017). As shown, predictions indicate that average winter and summer temperatures will increase, winter precipitation and runoff will increase, and summer precipitation and runoff will decrease.

Table A-2. Predicted Climate Change for Lynnwood Area in 2050 (interpreted from Mauger et al. 2017).

Climate Component	Historical	Lower Emission Rate Scenario	Higher Emission Rate Scenario
Average Winter Temperature	38 to 43 (degrees F)	+3 to +4 (change degrees)	+4 to +5 (change degrees)
Average Summer Temperature	60 to 64 (degrees F)	+3.9 to +5.6 (change degrees)	+5.6 to +7.2 (change degrees)
Winter Precipitation	34 to 45 (inches)	+7 to +8.5% (percent change)	+8.5% to +10% (percent change)
Summer Precipitation	8 to 16 (inches)	-10 to -6% (percent change)	Unknown[a]
Maximum 24-Hour Precipitation	1.6 to 2.3 (inches)	+10 to +15% (percent change)	+15 to +20% (percent change)
Summer Water Deficit	4 to 9 (inches)	+1 to +2 (change inches)	+1 to +2 (change inches)
Winter Runoff	12 to 24 (inches)	0 to +20%	0 to +20%
Summer Runoff	0 to 24 (inches)	-10% to 0%	-10% to 0%
Sea Level Rise [b]	NA	+14 to +54 (change inches)	+14 to +54 (change inches)

[a] Unknown: The projected changes are based on 10 different global climate models. If there was less than 80 percent agreement between the models on the direction of change, then the results are reported as unknown.

[b] Projected increase in the Puget Sound region from 2000 to 2100.

In addition to CIG's predictions, additional climate change models were reviewed. Table A-3 summarizes projections for extreme precipitation events (the top 1% of storms) for multiple models. Though these models vary with respect to the magnitude of the increase and the applicable region, they agree that climate change is likely to increase the magnitude of extreme storms.

Table A-3. Climate change projections and projected time frames.			
Article Title	**Applicable Region**	**Percent Change**	**Projection Time Frame**
Third National Climate Assessment: Intro to the Regions – Northwest[1]	Northwest	20% to extreme daily precipitation (ex. The annual wettest day)	2080s
Implications of 21st Century Climate Change for the Hydrology of Washington State[2]	Washington State	2-3% to annual runoff	2040s
Scenarios of Future Climate for the Pacific Northwest[3]	Pacific Northwest	20% to winter precipitation and -10% to summer precipitation	2080s
Climate Change and Stormwater[4]	Pacific Northwest	22% to the top 1% of storms	2080s
Impacts of 21st Century Climate Change on Hydrologic Extremes in the Pacific Northwest Region of North America[5]	Pacific Northwest	10-30% with potential up to 50% in some areas	2080s
Changes in Winter Atmospheric Rivers along the North American West Coast in CMIP5 Climate Models[6]	North American West Coast	4-6% to the top 1% of storms	2080s

[1] (Mote et al. 2014)
[2] (Elsner et al. 2010)
[3] (Mote, Salthe, Duliere, & Jump 2008)
[4] (Mauger et al. 2017)
[5] (Tohver, Hamlet, & Lee 2014)
[6] (Warner, Mass, & Salthe 2014)

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APPENDIX C

Surface Water Management Program Benchmarking Results

HERRERA

TECHNICAL MEMORANDUM

Date: November 06, 2017

To: Robert Victor

From: Rebecca Dugopolski, Matt Fontaine, and Meghan Mullen

Subject: Surface Water Management Program Benchmarking Results

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INTRODUCTION

Background

The City of Lynnwood (City) currently implements its Surface Water Management Program (SWMP) to achieve regulatory compliance and to minimize the adverse impacts of stormwater runoff on the natural and built environments (e.g., inspecting and maintaining the surface water system, managing peak flow volumes to avoid flooding, providing water quality treatment to mitigate impacts on receiving waters). Implementation of the SWMP is primarily the responsibility of the Utilities and Operations divisions of the Public Works Department, with support provided by the Community Development Department. The City's current SWMP activities are described in the 2016 SWMP (Lynnwood 2017a) that was submitted to the Washington State Department of Ecology (Ecology).

The City wants to consider a more proactive approach to surface water management. A consultant team led by Herrera (hereafter referred to as the consultant team in this memo) is supporting the City in this effort by updating the City's Surface Water Management Comprehensive Plan to define future SWMP activities and consider multiple service levels for each program area (e.g., maintenance and operation of the City's surface water systems, asset management, policies related to private facility maintenance and operation, capital project implementation). The process of updating the plan will enable the City to consider the advantages, disadvantages, and costs of a range of service levels in each program area.

This memorandum presents an analysis of how other municipal jurisdictions in western Washington are addressing several issues in their SWMP policies and actions, providing a basis for the City to benchmark several aspects of its current SWMP.

Objectives

Many jurisdictions in western Washington have developed surface water management programs to address the same issues that the City confronts with its program. To better understand the range of activities and service levels used by other jurisdictions, Herrera conducted phone interviews (i.e., benchmarking interviews) with five other jurisdictions in western Washington that exhibit at least one of the following characteristics:

- Similarity to Lynnwood in geographic area or population
- Discharge stormwater to the same receiving water bodies
- Early adopters of stormwater management program strategies that could serve as a model for the City of Lynnwood

Conducting this benchmarking exercise using these three characteristics helps to ensure that the City can use the results to evaluate its program performance relative to similar nearby jurisdictions and learn from cities that have taken proactive approaches to stormwater management. The results will be used by the City to help plan surface water management program policies and activities for each service level that is defined in the Surface Water Management Comprehensive Plan update.

METHODS OF ANALYSIS

Topic Areas

Through project scoping, an initial kickoff meeting, and subsequent meetings and discussions, the consultant team worked with City staff to identify surface water management program areas that are in need of improvement (topic areas) and developed questions for benchmarking interviews in each topic area. The benchmarking questions focus on the following SWMP topic areas:

- Stormwater facilities maintenance and operations
- Asset management
- Private facilities inspections, enforcement, and maintenance
- Surface water utility funding and spending
- Capital improvement projects review
- New development and redevelopment project review strategies

Selection of Benchmark Jurisdictions

Five jurisdictions (all cities in western Washington) were identified based on the criteria presented above; these are listed in Table 1, along with the contact information of the person interviewed for each, and the date they were interviewed.

Table 1. Benchmarking Contact Information.		
City	**Date**	**Contact Information**
Edmonds	July 20, 2017	Robert Edwards, Stormwater Engineer robert.edwards@edmondswa.gov
Kirkland	July 21, 2017	Jenny Gaus, Surface Water Engineering Supervisor jgaus@kirklandwa.gov
Shoreline	July 26, 2017	Uki Dele, Surface Water and Environmental Services Manager udele@shorelinewa.gov
Bothell	July 27, 2017	Janet Geer, Surface Water Program Coordinator janet.geer@bothellwa.gov
Vancouver	August 3, 2017	Nikki Guillot, Engineering Specialist nikki.guillot@cityofvancouver.us

Other Data Sources

In addition to the five cities that were interviewed, the benchmarking work incorporated research of policies in King County and insights gained by the consultant team in working with two other cities on previous projects:

- City of SeaTac
- City of Renton

BENCHMARKING RESULTS

Comparison to Lynnwood

Table 2 shows quantitative data for Lynnwood, the five benchmarking cities, and the two additional cities that were considered based on past experience of the consultant team.

Table 2. Quantitative Comparison of Lynnwood Characteristics with the Cities Used to Benchmark Surface Water Management Programs.

City	Area (sq. miles)	Population (2010 Census)	Stormwater Crew Size (FTEs)	Crew Members per 10,000 Residents	Stormwater Utility Rate (monthly for a single-family residence in 2017)
Lynnwood	7.8	36,000	6	1.7	11.85
Edmonds	8.9	40,000	5	1.3	13.37
Kirkland	11.1	49,000	17	3.5	17.21
Shoreline	11.7	53,000	10	1.9	13.27
Bothell	12.1	34,000	10	3.0	14.21
Vancouver	49.9	162,000	25	1.6	9.65
SeaTac	10.2	27,000	5.4	2	11.04
Renton	23.5	91,000	–	–	14.28

Results

This section presents a synthesis of benchmarking results and focuses on the results that may be most useful for informing City decisions related to the topic areas. See Appendix B for the benchmarking response matrix, which contains the full results.

Stormwater Facility Maintenance and Operations

Crew Sizes and Responsibilities

It is noteworthy that the two benchmarking cities with the highest surface water utility rate in 2017 (Kirkland and Bothell) also have the most surface water management maintenance and operations (M&O) crew members per capita. These cities' surface water management programs include asset management with life-cycle analysis, extensive technical assistance for the private stormwater facility inspection program, and public maintenance of private facilities that serve two or more single-family homes.

The City of Edmonds, with the fewest M&O crew members per capita, does not have a mowing or vegetation maintenance program within the surface water management program.

Among the benchmarking cities, the M&O crew responsibilities and resource sharing between utilities (e.g., sharing staff between surface water and transportation utilities) varies significantly, which limits the conclusions that can be drawn by simply looking at crew size as a metric, but it also introduces some resource sharing strategies that Lynnwood could consider:

- Surface water M&O crew members sometimes share responsibilities with Streets or Grounds crews in case of emergencies or as part of after-hours on-call teams.

- Surface water management program functions such as public facility maintenance and private facility inspections are sometimes contracted out or done by engineering staff rather than M&O crew members.

Incorporating Technology into Operations and Maintenance Activities

Field crews in four of the benchmarking cities use tablet or laptop computers to track inspection data and track work orders in the field. All interviewed cities use GIS to track work orders. Interviewees prefer tablets over laptops because they can be used to take pictures in the field.

Benchmarking cities offered several suggestions for adding technology to field inspections:

- Prior to adopting new technology, initiate a pilot time period to test multiple tablets or laptops and get feedback from staff based on real performance in the field.

- Minimize the number of steps needed to input data into the system, including the number of windows/screens/forms that staff must navigate through to enter data in the field, and the steps needed to sync or update data across platforms.

- Discuss expectations and benefits with staff early on to reduce misconceptions.

    - Misconception: Tablets will make inspections faster.

      Reality: Adding information to fields in a tablet is not faster than handwritten forms, but it allows for more efficient data entry and real-time tracking without a need to enter information later in the office.

    - Misconception: Adding more technology means a smaller staff.

      Reality: Real-time data entry enables crews to perform more detailed inspections instead of just completing work orders. The data collected can be used to justify more projects, which leads to a larger staff.

- All software platforms used by the benchmarking cities were integrated into GIS. Benchmarking cities use three different software platforms:
    - Cityworks software (used by the City of Shoreline) supported by a consultant implementation partner to customize the software to the city's needs. This support includes determining relevant, city-specific, data collection fields and mobile applications for using the software in the field.
    - Lucity software (used by the Cities of Kirkland and Bothell), which comes with an application for tablets.
    - Infor software (used by the City of Vancouver) that is accessible with laptops in the field.

Asset Management

All benchmarking cities but Edmonds have established asset management programs or are planning to start one. The level of integration with other departments or different components of the surface water management program varies significantly among the benchmarking cities. Some cities have separate databases and analysis software for private stormwater facilities, CCTV inspections, and public facilities. Others are working towards a single software platform for all public works divisions/activities.

Asset Management Software

The most common asset management software among the benchmarking cities is Lucity, which is also used for inspection tracking and work order generation and tracking in the field. Lucity planning capabilities include life-cycle analysis and infrastructure replacement planning. Infor software, an alternative asset management software to Lucity, also includes life-cycle analysis. Some of the benchmarking cities use asset management software to track work orders, but perform modeling and capacity assessments and cost-benefit analysis in the engineering group outside of the software.

CCTV Inspections

All of the benchmarking cities interviewed have CCTV inspection programs or are planning to start such a program in the next year. Some of them contract out CCTV inspections while others conduct inspections using an in-house camera truck. Some of these cities are using the CCTV inspection results to inform inspection schedules and others are planning on doing this in the future but currently are collecting data without having yet analyzed the data. Of the two cities with the same Lucity asset management software (Kirkland and Bothell), Kirkland performs criticality analysis using Lucity and Bothell uses a separate database. Overall, incorporating the results of CCTV inspection results into asset management has presented several challenges for the benchmarking cities:

- CCTV data is stored in a separate software platform from the rest of the stormwater conveyance system, or videos are archived outside of the asset management software.
- CCTV criticality analysis requires a separate software program relative to the asset management software used for the rest of the stormwater conveyance system.
- Data can be stored in asset management software, but an external Pipe Assessment Certification Program (PACP) database for standardized pipes and catch basin inspections has to be linked to the asset management database.

Private Stormwater Facilities

Inspections and Enforcement

All cities included in the benchmarking interviews reported that both older (facilities constructed prior to 2010) and newer (constructed in 2010 or later) privately owned facilities are part of the regular inspection program, though some cities inspect older facilities less frequently than new facilities. Cities reported that the same inspection standards are used for older and newer facilities, though repairs are made using as-built drawings for older facilities rather than stormwater manual standards, which are used for new facilities. Benchmarking cities have developed several methods to make private facility inspections more efficient:

- Self-inspection. Self-inspection forms are mailed to owners to be filled out and mailed back to the city. This approach is similar to King County's private facility inspection program. This approach has not been shown to decrease the failure rate of private facilities, but the forms help save time for the facility owners that take advantage of them.
- Alternating self-inspection. In King County, privately owned facilities are inspected by the County every other year, and by the owner on alternating years. For facilities with consistent compliance, inspection frequency can be reduced.
- Modified inspection frequency. Shoreline changed its inspection frequency to biannually unless a failure is detected; and Vancouver inspects older facilities less frequently than newer facilities, though their inspection frequency is still regular.
- Ecology grant. In Vancouver, many facilities not regulated by the City of Vancouver's NPDES permit are not mapped. The City of Vancouver applied for and received a grant from Ecology to inspect all private facilities, including older facilities and infiltrating facilities not connected to the municipal separate stormwater system (MS4), to complete their mapping and improve their inspection program.

Maintenance

None of the benchmarking cities have established a procedure for performing regular public maintenance on private facilities. Some cities have made agreements in the past to perform maintenance on private facilities, but these are special cases; and these cities are not looking to take on more facilities to maintain. The City of Renton established a program to take over private stormwater facilities within homeowners associations (HOAs). They had a unique situation where about half of the 100 facilities in neighborhoods covered by HOAs were privately maintained and the other half were publically maintained. The reason for this discrepancy was that Renton's standard was to keep maintenance private, but they inherited public responsibility for maintenance when Renton annexed areas from King County, because King County's standard is for HOA stormwater facilities to be dedicated to the County. All of the citizens within HOAs in Renton were paying the same surface water utility rate. Thus, there was an inequity issue because about half of these citizens were getting their facilities maintained by the City of Renton and the other half not. Renton established the program, and thus far about 16 facilities have been taken over by the City of Renton.

The City of SeaTac has a policy in place to spend public funds on private stormwater facilities for capital and emergency projects, though this does not include long-term M&O of private facilities. The City of Bothell is considering taking over maintenance of private facilities, though this plan has not been fully developed.

Pathways that enable public maintenance of private facilities include:

- City code. In Kirkland, stormwater facilities that service two or more single-family homes are automatically maintained by the City of Kirkland when constructed.
- Covenant agreements. Required to be signed by developers, giving owners 14 days to address a performance failure before the city can perform maintenance and bill the owner.
- Abatements during emergencies. City staff can enter private property without easements and perform simple or temporary maintenance, like removing debris or constructing a sandbag berm, until the owner can implement a long-term solution.
- Retrofit opportunities. When private facilities are being upgraded or repaired, cities can form agreements with owners to assume maintenance of the facility if repairs and retrofits on the facility enable the facility to manage runoff from public and private areas.
- Public takeover of private facility maintenance. For facilities that serve two or more single-family homes, public takeover is being considered by the City of Bothell if funding can be found for facilities in need of extensive repair.

Outreach Methods

The cities interviewed agree that voluntary compliance is the goal of private facility inspections. Few cities have offered workshops focused on maintenance training, and instead rely on handouts and individual inspection meetings for both outreach and technical assistance. These methods can be passive—standard packets containing vendor information and maintenance guidelines—or personalized to the facility owner. Successful outreach methods for private stormwater facility owners that some of the benchmarking cities have experienced, and corresponding lessons they shared, are listed below.

- Individualized facility maps. A system of relying on the land title to convey stormwater facility maintenance responsibilities is not reliable because few land owners read the title. Instead, the City of Kirkland has developed maps of all low-impact development (LID) facilities to be sent to owners annually along with maintenance needs, so that they can better understand their facility.

- Standardized brochure. A mailed packet including maintenance guidelines, checklists, and handouts is sent to private facility owners along with the inspection deadline. One source for this material in Clark County (in which Vancouver is located) is Stormwater Partners Southwest, an organization that was formed in 2009 with an Ecology grant, to provide consistent guidance to neighborhoods and businesses for private stormwater facility maintenance.

- Contact list. A list is regularly updated to include contacts for HOAs and private facilities serving two or more single-family homes.

- HOA and neighborhood association meetings. Vancouver is planning to fund City of Vancouver staff attendance at meetings with HOAs using an Ecology grant.

- Defunct HOA contact procedure. For most cities, this process starts with a series of letters to contact all residences that were previously in the HOA, followed by facilitated meetings to help residents select and hire a contractor to perform any maintenance or repair work needed. City of Renton staff have assisted in reestablishing HOAs by connecting active citizens to the Washington Office of Secretary of State. For a reasonable fee, the state can reestablish a HOA.

Surface Water Utility Fund

Revenue Sources

The surface water programs in all benchmarking cities are funded by rate payers and grants from Ecology. Some of their utilities also receive funding from the general fund, connection fees, and system development charges.

Rate Structure

The City of Kirkland evaluated trip generation as a potential basis for its commercial and multi-family stormwater utility rate, but found the method to be too complicated.

Rate Credits

Credits are awarded by some cities for proof of stormwater facility maintenance, equivalent impervious area, preserving existing vegetation, rainwater harvesting systems, and installing rain gardens. Bothell no longer has a credit system.

Spending Policy

There are multiple approaches for determining how funds collected by the stormwater utility are applied to capital projects, including projects led by other city departments:

- Case by case: This is the most common method for determining whether projects not led by the "home" of the surface water utility (typically the public works department) will receive funding from the surface water utility. Funding may be awarded based on the percentage of the project related to surface water management or the cost of materials and labor related to surface water management. With this approach some projects receive funding from the surface water utility and others do not.

- City code: Clear requirements for surface water management spending can be included in the code, such as King County's "Enabling uses," which include "basin planning, facilities maintenance, regulation, financial administration, public involvement, drainage investigation and enforcement, aquatic resource restoration, surface and storm water quality and environmental monitoring, natural surface water drainage system planning, intergovernmental relations, and facility design and construction."

- Operations and Maintenance costs: In Shoreline, no surface water utility funding can be used to build stormwater facilities, but funding is allocated to maintain facilities constructed as parts of other public projects.

- Utility tax or fixed contribution: Regular funding of other departments that support surface water management projects (such as GIS and finance departments). In Kirkland, a set contribution of the Stormwater Utility Fund is added to a "transportation fund," which is used for the surface water management components of transportation projects.

CIP Review Process

The benchmarking cities collectively use several approaches to reviewing public projects, including:

- Review of public and private projects follow the same process.
- Review of public and private projects follow different processes: IN some cities, public and private projects are reviewed by different departments.
- Review of public and private projects follow the same process, except for some streamlining: The City of Kirkland has made an effort to streamline the review process for projects that do not require permits, though this is balanced by the benefit of considering all CIPs as potential retrofit opportunities, and the original scope of the process does not include surface water management components.

New Development and Redevelopment Handouts

In general, the benchmarking cities offer checklists and handouts for developers to use when planning surface water management on new development and redevelopment projects. Some cities are in the process of developing new or additional handouts.

The biggest source of confusion surrounding development and redevelopment guidelines occurred in a city that recently switched from using Ecology standards to King County standards. This issue is not a concern for the City of Lynnwood.

In Shoreline, the same checklists provided for developers are also used successfully by city staff who conduct development reviews.

NEXT STEPS

This memorandum and the attached results matrix will be used to define City policy options and potential activities in each program area when developing the level of service matrix for the Surface Water Management Comprehensive Plan.

REFERENCES

NASSCO, Inc. Pipeline Assessment Certification Program. <https://www.nassco.org/content/pipeline-assessment-pacp>.

Stormwater Partners of Southwest Washington. <http://www.stormwaterpartners.com/partners.html>.

Cityworks | Azteca Systems, Inc. "What is Cityworks?" <http://www.cityworks.com/products/what-is-cityworks/>.

Lucity. <http://www.lucity.com/Software/Deployment-Integration-Reporting>.

King County. 2008. Drainage and Maintenance Standards for Commercial and Multifamily Drainage Facilities. Department of Natural Resources and Parks. Water and Land Resources Division. June.

APPENDIX A

Questionnaire

Contact Report

Person Contacted: _____ **Phone No.:** _____

Representing: _____ **Date:** _____

HEC Representative: _____ **Time:** _____ **a.m.** ☐ **p.m.** ☐

Project No.: 16-06374-000

Subject: Stormwater O&M, Private Facilities, Stormwater Utility Fund

Topic 1: Stormwater O&M

1. How many people are on your stormwater O&M crew?

2. What are the primary stormwater-related work duties of O&M staff (different than engineering and development review staff)?

   ☐ Catch basin inspections and cleaning
   ☐ Public stormwater facility inspections and maintenance (ponds, vaults, proprietary BMPs, etc.)
   ☐ Mowing and vegetation maintenance
   ☐ Stormwater conveyance system inspections, cleaning, and maintenance (pipes, culverts, ditches)
   ☐ Street sweeping
   ☐ Illicit discharge field screening and source tracing
   ☐ Business (source control) inspections
   ☐ Private stormwater facility inspections

   Other: _____

3. Do your stormwater O&M staff funded by the stormwater utility support Streets or other utilities some of the time?
   ☐ Yes
   ☐ No

   a. More than 25% of the time?

   ☐ Yes
   ☐ No

   b. What other crews support stormwater O&M work (for example, during storm response activities)?

   ☐ Streets
   ☐ Other utilities: _____

4. How is technology being successfully added to O&M activities?

    a. When was technology incorporated into inspections?

    b. How easy is it to learn and what helped make it easy?

    c. What are useful in-between steps for incorporating technology into O&M activities?

    d. What hasn't worked?

Topic 2: Asset Management

5. Does you have an asset management program?

    ☐ Yes
    ☐ No

6. What elements does your asset management program include?

    ☐ Map updates
    ☐ CCTV pipe inspections and conditions assessment
    ☐ Modeling and capacity assessments
    ☐ Life cycle analysis
    ☐ Infrastructure replacement planning

7. What asset management software do you use?

    a. How long have you been using this software?

    b. What are the benefits and drawbacks of this software?

    c. Is there a mobile app for conducting inspections that is linked to this software? Was it provided by the software developer, developed in-house, or developed by a consultant?

8. How do you prioritize CCTV inspections of the stormwater system?

Topic 3: Private Facilities –

9. What role(s) does the City currently have related to private stormwater systems?

	Yes	No	Limited
Annual inspections (as required by the NPDES permit)	☐	☐	☐
Technical support (as requested)	☐	☐	☐
Outreach (proactive)	☐	☐	☐
Enforcement (as needed)	☐	☐	☐
Publicly-funded maintenance of private stormwater systems	☐	☐	☐
Transfer of ownership and maintenance responsibility	☐	☐	☐

Other: _____

10. What is your step-wise procedure when deficiencies related to O&M are identified during your annual inspections of private stormwater facilities?

- ☐ Initial notification
- ☐ Follow up notification
- ☐ Proof of work done (contractor invoice)
- ☐ Follow up inspection (by City)
- ☐ Enforcement (if necessary)

Other: _____

11. If technical support is provided to property owners to assist with O&M of their stormwater facilities (see response to question #9), what does this technical support entail?

- ☐ On-site assistance
- ☐ Internet resources
- ☐ Guidance documents

Other: _____

12. Does your jurisdiction provide any education and outreach activities to improve maintenance of privately-maintained stormwater facilities?

a. If yes, what type of activities have been conducted and have they been effective?

- ☐ Handouts
- ☐ Workshops
- ☐ Internet resources

13. Which types of private development are best or worst at maintaining their facilities?

    a. What types of facilities do these development types typically construct?

    b. How do you address problem facilities?

14. In what cases does your staff enter private property and perform corrective work on privately-maintained stormwater facilities (if ever)?

15. How does your jurisdiction handle defunct HOAs or difficulties identifying the responsible party of a privately-maintained stormwater facility that requires inspection and maintenance?

16. If your jurisdiction performs routine maintenance on privately-developed stormwater facilities, answer the following: (see response to question #9: Publicly-funded maintenance of private stormwater systems)

    a. Why and when did your jurisdiction decide to take over O&M of certain privately-developed stormwater facilities?

    b. What factors trigger the takeover of older facilities?

    c. Which of the following development/facility types does your jurisdiction typically take over?

        ☐ SFR lots/short plats [Is it dependent on road ownership?]
        ☐ Commercial
        ☐ Industrial
        ☐ Multi-family
        ☐ Conveyance systems that pass through private lands

        Other: _____

    d. What type of agreement do you make with private facility owners before taking over O&M activities?

        ☐ Full ownership of parcel
        ☐ Long-term maintenance agreement
        ☐ Annually renewed contract

        Other: _____

e. How/where does your jurisdiction specify the minimum requirements for a private stormwater facility prior to your jurisdiction accepting responsibility for O&M (including easements for access)? (written procedure?)

f. Is there a cost recovery mechanism in place for public maintenance of private stormwater facilities?

i. How does your jurisdiction approach cost recovery (partial or full) of public maintenance of private stormwater facilities?

☐ Annual charge
☐ Invoiced after work has been performed
☐ No charge (e.g., Funded by stormwater utility fund

Other: _____

g. How many staff are required to implement this program?

h. What are your thoughts on both the initial and/or long-term difficulties associated with implementing public O&M of privately-developed stormwater facilities?

i. What are your thoughts on the benefits of public O&M of privately-developed stormwater facilities?

j. If you could change the process associated with public O&M of privately-developed stormwater facilities, what would you like to see changed/improved?

☐ Permitting
☐ Project approval
☐ Maintenance agreement
☐ Other:
☐ Project design
☐ Easement requirements
☐ Cost recovery

17. What standards do you use for inspection and maintenance of older stormwater facilities (e.g., facilities permitted or constructed prior to implementation of the 2005 Ecology manual)? [August 2009 for Phase IIs; August 2008 for Phase Is]

18. Does your jurisdiction have any plans for changing how O&M of private stormwater facilities is managed by your jurisdiction in the future?

19. Does your jurisdiction have privately owned stormwater conveyance pipes that receive stormwater from the public system?

    ☐ Yes
    ☐ No

    a. Do these lines ever cause problems and how does the City address them?

    ☐ Yes
    ☐ No

Topic 4: Capital Projects [5.2]

20. How does your stormwater design review and submittal process work in terms of the stormwater design on City capital projects (e.g., for stormwater on a transportation project)?

    a. How is the process used for public projects different from the process for private projects?

Topic 5: Stormwater Utility Fund [5.3]

21. How is your Stormwater Utility funded?

    a. Entirely by rate payers?

    ☐ Yes
    ☐ No

    If no, what are the other revenue sources to the Utility?

    b. What is the basis for your commercial and multi-family stormwater utility rate?

        ☐ ERU, ESU, or ISU
        ☐ Actual impervious surface
        ☐ Trip generation

    Other: _____

c. Do you provide any stormwater utility rate credits for existing stormwater facilities and does maintenance get factored into the credit?

   i. Is there a maximum cap on what that credit is?

   ☐ Yes
   ☐ No

   ii. Do you provide different credits for different facility types (flow control and water quality treatment versus flow control only)?

   ☐ Yes
   ☐ No

d. Are you currently working on a rate increase or do you have an approved rate increase for 2018?

22. What limits or procedures are in place regarding the use of the funds collected by your Stormwater Utility?

23. Does the Stormwater Utility have mandatory contributions to other utilities?

24. Is Stormwater Utility funding used on projects that are led by other utilities (e.g., transportation projects)?

    a. Is there a system or policy in place for limiting this?

    b. What portion of the Stormwater Utility fund gets allocated to surface water utility projects every year (these are true surface water/stormwater projects not funding for the minimum stormwater BMPs required on any new public development project such as a road, sidewalk, or parks project)?

25. What is done with any surplus in the Stormwater Utility Fund at the end of the fiscal year?

Topic 6: Development / Redevelopment

26. Has the City developed checklists, handouts, or worksheets to assist applicants with implementation of Minimum Requirement #5 (On-site Stormwater Management) or Minimum Requirement #2 (Construction Stormwater Pollution Prevention)?

    ☐ Yes
    ☐ No

    a. Are developers using these checklists, handouts, and worksheets effectively?

        ☐ Yes
        ☐ No

    b. Which ones get the most use?

APPENDIX B

Results Matrix

Table B-1. Stormwater Program Benchmarking Results.

Topic	Lynnwood	Edmonds	Kirkland	Shoreline	Bothell	Vancouver
Stormwater M&O Crew	• 6 FTE, not including Jesse and Kris. • Streets supplement storm during large storm events. • About 20 percent of the time, Storm is pulled to streets for maintenance during summer months.	• 5 people focused on stormwater. • No program for mowing or vegetation maintenance. Staff support streets less than 25 percent of the time.	• 17 stormwater crew members. • Funding from Ecology for a local source control program. • Mowing and vegetation maintenance (ponds and LID facilities) done by Grounds within Streets. • Street sweeping is split: Streets (25 percent) and stormwater (75 percent). • Rehabilitation, repair, and replacement program.	• 10 maintenance staff, some split between roads and stormwater. • Inspections are mostly done in-house, but maintenance is contracted out.	• 10 staff in the stormwater crew. • Illicit discharge field screening and source tracing is split between O&M and engineering. • Source control and private facility inspections are done by the Engineering group. • Stormwater, along with water, sewer, and streets support an after-hours on-call team.	• 25 staff split into 3 teams: o Grey team: catch basins, street sweeping, underground facilities. o Green team: non-structural facilities like swales and ditches. o Sensitive lands team: Birbridge Creek Greenway, habitat restoration, wetlands. • Private facility inspections done by the engineering group. • No overlap with other utilities.
Stormwater M&O Technology	• Paper forms in the field and manual data entry. • Using tablets for field inspections has not worked in the past. It does not seem efficient to enter notes using a tablet in the field. • Cartegraph (need a new software). o Cartegraph location information, spreadsheet database, and as-builts for historical stormwater facilities. • GIS.	• Paper forms in the field and manual data entry. • GIS used in the office.	Tablets since 2012 (5 years). Steps to success: • Have fewer steps for filling out forms (old tablet system [Hansen] involved more steps). • Limited webmap data also available to the public. Challenges: • More and more members of the crew have smartphones that they use to take pictures. The City should provide smartphones, or the crew should use City tablets for this. • Mobile app for tablets developed in-house.	Tablets since 2013 (4 years). Cityworks software. Benefits: • Implementation partner (Woolpert) to fit City: customized fields and applications. • Stored data can be accessed for simple Excel calculations. Steps to success: • Pilot period to get staff feedback: o Samsung: least favorite. o Toughbook: best connection. o Apple: most familiar. • Make expectations for data entry timing and clear: not faster in the field, but more efficient management. Challenges: • Inconsistent network connectivity in the field slows down data entry.	Tablets since 2017 (5 months). Lucity software. Benefits: • Tracking work orders and work flows; easier to track deadlines. • Comes with an app for tablets and is integrated into GIS. Steps to success: • Maps were useful immediately for field crews. • IS department chose Android tablets. Challenges: • Private facility inspections are not included in Lucity. • At first, the app designed was too "click happy."	• Laptops since 2011–2012 (5 years). o Panasonic Toughbooks. Advice: • Make everything connected! • Initial perception that adding more technology would cost jobs. Real-time data entry enabled crews to do inspections and analysis justified more projects and more staff. • Ideally, tablets would be better in the field than the laptops because you can take pictures with them. • Lucity comes with a good mobile app for tablets.

Table B-1 (continued). Stormwater Program Benchmarking Results.						
Topic	**Lynnwood**	**Edmonds**	**Kirkland**	**Shoreline**	**Bothell**	**Vancouver**
Asset Management	No asset management program.	No asset management program.	Lucity since 2017 (6 months). Benefits: • All in one planning capabilities. • Map updates. • Includes life-cycle analysis and infrastructure replacement planning (why software was chosen, not yet used). Challenges: • Modeling and capacity assessments are done by the engineering group. • Private facility information not yet incorporated into Lucity; still using separate "VUEWorks" system developed using an Ecology grant.	Challenges: • Clunky steps for storing CCTV data, which requires criticality analysis outside of Cityworks. Next Steps: • Asset management program will be used for planning and resource utilization analysis. • All utilities at the City should use one software.	Next Steps: • Asset management program will be part of the next comp plan.	Infor since 2011–2012. Benefits: • Interns working with iPads to update catch basin attributes in the field. • Reporting function for the public to make service requests and report issues. • Same software for outfall screening, erosion control, private and public work orders. • Integrated with GIS. • Life cycle analysis. • Planning for risk and outreach. Drawbacks: • No mobile app. • Separate software for CCTV.
CCTV Inspections	Goals for the future: • Inventory known lines. • Hire a video truck and video lines internally, 15 percent each year.	Program is just starting: the City is getting a camera truck to begin CCTV inspections during the new Stormwater Comp Plan later this year or next year.	• CCTV analysis through Lucity asset management system, though videos are archived elsewhere.	Program is ongoing. • Contractor hired to inspect conveyance 12 inches or greater. • Determine critical pipes in-house. • Contract out repairs.	• Not part of Lucity. • Separate program to track inspections and mark pipes for repair based on inspection results. • Discussion of linking this to asset management in the future.	• Program started in 2008. • Before this, work was done as-needed. • Data stored in database, no analysis yet. Next steps: • Locate and map all pipes including private pipes.

Table B-1 (continued). Stormwater Program Benchmarking Results.

Topic	Lynnwood	Edmonds	Kirkland	Shoreline	Bothell	Vancouver
Private Facilities Inspections	• Conducts annual inspections of known private stormwater facilities designed to meet MR#6 and/or MR#7. • List of unknown facilities is potentially large. • Difficult to find contact people for residential facilities (HOAs).	• Inspection program is in development. • City staff investigate when complaints are received and perform follow-up inspections to ensure that work has been performed. • Staff member in charge of handouts and workshops for owners, but no other technical support. • A list of HOAs it maintained by the City which contains contact people. Updating this list can be difficult.	• More technical assistance than outreach: inspector meets with owners during inspections and discusses next steps and gives recommendations. • In January, the City started a new project to create maps for all private LID facilities to send to land owners annually. This has been a labor-intensive project to replace the old system of recording facility ownership and needs in the title. This is going to be done early next year.	• Inspecting 180 of 300 facilities per year. • Adjust accepted by ecology to only inspect every two years unless failure is detected. • Technical support packets are mailed prior to inspections. Next steps: • The City hopes to implement self-inspections: owners will be mailed instructions to perform a self-inspection and then send proof back to the City. • Similar program in King County and Seattle; King County has observed no change in failure rates.	• Technical support: a vendor list of licensed vendors is provided to owners, no other proactive support.	• Few facilities connected to MS4 or surface water, infiltrating facilities inspected every 3 to 5 years. • Initial brochure with deadline to set up an inspection contains guidance from stormwater partners southwest. o Goal is to achieve voluntary compliance. • Grant from ecology for two years to inspect all private facilities. • Process for contacting defunct HOAs: series of letters to everyone, public meeting, assistance. o Applying for a grant to attend HOA meetings.
Public Maintenance of Private Facilities	• Repair crews sometimes enter private property in emergencies, mostly to address debris accumulation. Enforcement: • Recovering Cost of Abatement. • Cease and desist or stop work order. • Escalating enforcement approach.	• No public maintenance of private facilities. • Private sites are accessed by City staff only through easements.	• Enforcement is customized to the client: more hand-holding needed for larger clients. • Kirkland maintains private stormwater facilities that serve two or more single family homes. • HOAs are not required, so there are not as many issues with HOAs being unreachable. HOAs still present a challenge with LID maintenance. • Only one case of assuming public maintenance of a private facility: school retrofitting a pond, City saw an opportunity to also handle roadway runoff, agreed initially to take over maintenance if the school built it.	• Because King County used to maintain residential private facilities, there are many older facilities that the City now maintains. o The City hopes to return maintenance responsibility back to the owners. • Covenant agreements signed by developers give owners 14 days to address failure or the City will send a bill for maintenance performed. • Recent code change allows abatements during emergencies so that the City can enter private property without an easement.	• No publicly funded maintenance of private systems. • An order to maintain (private work order) is sent is the inspection results in a failure. This is returned or emailed back to the City. • The City is developing a more formal process. • Enforcement is limited to emergency/hazard situations. • Text in the code allows for emergencies or inspection access. • Defunct HOAs: contact individuals and request that they hire a contractor. • The City is performing an analysis of whether to take over maintenance of private systems serving 2 or more single family residences. The question is how to prepare properties for take over because many require extensive repair.	• Public crews only enter in extreme cases, and only to make temporary modifications.

Table B-1 (continued). Stormwater Program Benchmarking Results.						
Topic	**Lynnwood**	**Edmonds**	**Kirkland**	**Shoreline**	**Bothell**	**Vancouver**
Private Conveyance Connected to the Public System	Approximately 50 places (40,000 LF) where the MS4 discharges into private conveyance, which either flows back into the MS4 or to a surface water body.	None	N/A	• Recent council decision: pipes that present problems will be considered case-by-case for easements or addition to the ROW. • Strategic Management program in Bellevue to assume maintenance to any pipes connected to the public system.	No problems caused by these pipes.	• Problems are infrequent. • The City has easements when issues arise.
Old Versus New Private Facilities	• Not all older facilities are in the database.	• All facilities are inspected and maintained. • Unknown standard.	N/A	Same standards for old and new facilities.	• All facilities inspected using current standards in the King County Manual. • Repairs made to the original design manual for older facilities. • Older facilities are inspected regularly, but not annually like those subject to the 2005 Permit.	• All facilities use current standards. • Approved plan is used for repairs.

Stormwater Utility Funding	• Funded through the water-sewer bill entirely by rate payers.	• Funded through the water-sewer bill entirely by rate payers.
		• Basis for commercial and multi-family rate: ERU.
		• No plan to change the rate system.
		• Credit system awarded during the design process for equivalent impervious area.
			• Funded entirely by rate payers and some grants.
			• Basis for commercial and multi-family rate: ESU.
			• Trip generation considered because of water quality impacts, but too complicated to implement at the time.
			• Credit for rain water harvesting systems which is required by the state: 10 percent reduction for the capture area.
				• Funded entirely by rate payers and some grants.
				• Basis for commercial and multi-family rate: ISU.
				• No plan to change the rate system; billing done by King County.
				• Rebates for preserving existing vegetation and installing rain gardens.
				  o Maximum cap of $1,600
				• Planned increase of 5 percent per year.
					• Funded by rate payers, connection fees, grants, and the general fund.
					• Basis for commercial and multi-family rate: ERU.
					  o Evaluating a shift to actual impervious surface in the future; shift burden from commercial to residential.
					• Credits removed 4 or 5 years ago.
					• 2.5 percent increase planned based on consultant plan
						• Funded entirely by rate payers, system development charges, and grants for water quality retrofits.
						• Actual impervious surface used for commercial utility rate (GIS staff member calculates area).
						• Up to 50 percent credit to maintaining any facility.

Table B-1 (continued). Stormwater Program Benchmarking Results.

Topic	Lynnwood	Edmonds	Kirkland	Shoreline	Bothell	Vancouver
Stormwater Utility Spending	• SW utility funding is sometimes used to initiate projects led by other utilities; accounts for the surface water infrastructure portion of the project but paid in advance. • Utility has found it difficult to implement SW CIPs due to lack of available funds, though SW CIPs are included in the financial analysis. • Considering policy options to constrain use of SW funds on projects that are led by other utilities.	• Projects driven by another utility get some funding for stormwater components. • Case-by-case basis using percentage of the project related to stormwater. • At the end of a year, funds carry over to support ongoing projects.	• Policy in place; all items must be justified in accounting for non-stormwater specific projects. Case-by-case basis. • $0.5 M per year is added to a "transportation fund" which is used for the stormwater part of transportation projects. • Carry over for projects in process, the rest goes to reserves.	• Funding is not and will not be used to build stormwater facilities. Next steps: • The funding will only go to O&M for facilities built as part of projects in other utilities. • The utility only wants to get involved with the O&M planning so there are not unexpected choices made with different proprietary BMPs. • There is no funding for this yet. The rate will increase to accommodate this.	• Funding for stormwater only based on King County "enabling uses" in the City code. • Some funds go to GIS and Finance departments for stormwater related work. • Stormwater funding for non-stormwater projects handled on a case-by-case basis: in one example, pipes were covered, in another, no funds were used. • Surplus put into a reserve fund and the rate is decreased from the projected value.	• Utility tax: some funding goes to transportation maintenance and the police. • No stormwater funding is spent on outside projects.
Development and Redevelopment Review Strategies	• Lynnwood has been working on handouts for developers based on Sequim and Port Angeles tools, but a full developer toolkit is needed and there hasn't been time or money to develop it.	Checklists, handouts, and worksheets have been available for one month.	Currently developing these in-house.	• Step-by-step forms online and special summaries for small to medium-sized projects. • Development review engineers on staff use the checklists for project review, not sure about private developers.	• King County handout given to permit technicians, not sure if it is being used. • Confusion due to switching from Ecology to King County standards.	• Erosion control checklist is being used by developers. • The City is developing a handout for MR5 (onsite stormwater management).
CIP Review Process	City is short-staffed for review of public projects. • Jared reviews public (CIP) stormwater site plans. • Darlene reviews public construction SWPPPs. • Bid ready checklist which requires signatures from reviewers.	• There is an internal review for all projects. • If the project includes grants, then the plan is sent to Ecology for review. • The same principles are used for public and private projects. Typically, private commercial projects are larger and therefor have more demanding requirements and higher standards for inspection.	• City is short-staffed for review, considering consultant help. Recent push to streamline the review process for projects that to not require permits, though this will be difficult because CIPs provide opportunities for additional retrofits (advanced planning for regional projects).	• All projects are reviewed in-house. • Process is different for public and private projects. o Private: Team of reviewers. o Public: Engineers review.	• Capital engineers review consultant designs, including stormwater portions of the design. • For commercial projects, there is a different process: reviewed by design review engineers.	• No difference between private and public review process.

APPENDIX D

NPDES Permit Compliance Gap Analysis and Needs Assessment

NPDES PERMIT COMPLIANCE GAP ANALYSIS AND NEEDS ASSESSMENT

CITY OF LYNNWOOD STORMWATER MANAGEMENT PROGRAM

Prepared for
City of Lynnwood

Prepared by
Herrera Environmental Consultants, Inc.

HERRERA

Note:
Some pages in this document have been purposely skipped or blank pages inserted so that this document will copy correctly when duplexed.

NPDES PERMIT COMPLIANCE GAP ANALYSIS AND NEEDS ASSESSMENT

CITY OF LYNNWOOD STORMWATER MANAGEMENT PROGRAM

Prepared for
City of Lynnwood
Public Works Department
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June 15, 2018

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INTRODUCTION

BACKGROUND

The City of Lynnwood (City) currently implements its Stormwater Management Program (SWMP) to achieve regulatory compliance and to minimize the adverse impacts of stormwater on the natural and built environments within the City's jurisdiction (i.e., managing peak flow volumes to avoid flooding and providing water quality treatment to mitigate impacts of urban development on receiving waters). Implementation of the SWMP is primarily the responsibility of the Public Works Department, with support provided by the Community Development Department.

The City's current SWMP activities are described in the 2017 SWMP (Lynnwood 2016a) that was submitted to the Washington State Department of Ecology (Ecology). The SWMP includes information on planned SWMP activities to meet the requirements of Ecology's National Pollutant Discharge Elimination System Western Washington Phase II Municipal Stormwater Permit (NPDES Phase II Permit; Ecology 2013), which is the most significant regulatory requirement driving the City's SWMP. The 2017 SWMP is currently posted on the City website. Pursuant to the NPDES Phase II Permit, the City must also prepare annual reports to document activities implemented to meet the associated requirements. The annual reports are submitted electronically to Ecology and are available to the general public upon request.

Herrera Environmental Consultants (Herrera) reviewed the City's current SWMP activities to identify if there are gaps in the SWMP relative to the requirements of the NPDES Phase II Permit requirements. This report recommends SWMP improvements that are needed to address the identified gaps and fully comply with the NPDES Phase II Permit. The recommendations will be used by City staff to direct further SWMP activities and to help guide the City's Surface Water Management Comprehensive Plan update, which was in process at the time this report was prepared.

METHODS OF ANALYSIS

Herrera, in coordination with City staff, compared current and planned SWMP activities to the NPDES Phase II Permit requirements. Potential gaps and areas for improvement were identified through a review of available documents, questionnaire responses, and discussion meetings with City staff, as shown in Table 1.

Table 1. City of Lynnwood Stormwater Management Program Discussion Meetings.		
Meeting Topic(s)	**Meeting Date**	**Meeting Attendees**
Kickoff Meeting	April 17, 2017	• City Staff: Robert Victor, Jared Bond, Les Rubstello, Bill Franz, Jeff Elekes, Jesse Perrault • Consultant Team: Matt Fontaine, Rebecca Dugopolski, Meghan Mullen, Jay Cammermeyer, Sergey Tarasov
Maintenance and Operations (M&O) Program Current Status	April 25, 2017	• City Staff: Robert Victor, Jared Bond, Les Rubstello, Jesse Perrault, Paul McIntyre, Eric Peterson • Consultant Team: Rebecca Dugopolski, Meghan Mullen, Jay Cammermeyer
Surface Water Management Program Current Status	May 2, 2017	• City Staff: Robert Victor, Jared Bond, Les Rubstello, Arnold Kay, Darlene Stokes, Derek Fada • Consultant Team: Rebecca Dugopolski, Meghan Mullen, Jay Cammermeyer
M&O Program Goals and Objectives	June 20, 2017	• City Staff: Robert Victor, Jared Bond, Les Rubstello, Paul McIntyre, Jesse Perrault • Consultant Team: Rebecca Dugopolski, Meghan Mullen
Surface Water Management Program Goals and Objectives	August 21, 2017	• City Staff: Robert Victor, Jared Bond, Les Rubstello, Arnold Kay, Bill Franz • Consultant Team: Rebecca Dugopolski, Meghan Mullen

Document Review

Herrera reviewed all pertinent documents identified and/or provided by the City, including City codes and policies, maps and GIS data, planning documents, SWMP documents, and Stormwater Utility fee documents to provide a foundation for the SWMP characterization.

Kickoff Meeting and Questionnaire

To help examine the components of the City's SWMP in more detail and to identify previously undocumented issues, City staff members representing all aspects of the City's SWMP implementation were invited to a kickoff meeting in April 2017.

A NPDES Phase II Permit Gap Analysis questionnaire was distributed to participants in advance of the kickoff meeting to gather staff input and perspectives on a variety of stormwater issues. The completed questionnaire was used to shape and facilitate the meeting discussion, focusing on NPDES Phase II Permit requirements and other issues of concern to City staff. The questionnaire is provided in Appendix A.

Maintenance and Operations Program Discussion

City staff members representing the Maintenance and Operations (M&O) program met on two occasions to discuss the current status of M&O related to surface water and goals and objectives for different tiers of service. At the first meeting with the M&O subgroup, portions of

the Gap Analysis Questionnaire related to M&O and asset management were used to define the current level of service and to identify gaps in the existing program. The existing level of service and gaps identified in the City's M&O activities are detailed in Appendix B. The second meeting with the M&O subgroup was used to discuss potential upcoming changes in the NPDES Phase II Permit and actions for different program areas in higher tiers of service. Appendix C contains notes from this meeting.

Surface Water Management Program Discussion

City staff members met to discuss the SWMP with representatives of the Public Works Department on two occasions. The first meeting with the Surface Water Management Program subgroup was to establish the current level of service using portions of the Gap Analysis Questionnaire related to the SWMP. The existing level of service and gaps identified in current SWMP activities are detailed in Appendix B. The second meeting was held to discuss potential upcoming changes to the NPDES Phase II Permit and to identify actions for different program areas in higher tiers of service. Appendix D contains notes from this meeting.

Benchmarking

Many jurisdictions in western Washington have developed surface water management programs, including M&O activities, to address the same issues that the City confronts with its program. To better understand the range of activities performed by other jurisdictions, Herrera conducted phone interviews (i.e., benchmarking interviews) with five other cities in western Washington to provide a basis for the City to benchmark several aspects of its SWMP. Interview topic areas included:

- Stormwater facilities maintenance and operations
- Asset management
- Private facilities inspections, enforcement, and maintenance
- Surface water utility funding and spending
- Capital improvement projects review
- New development and redevelopment project review strategies

Results of this benchmarking analysis (Herrera 2017) were used to guide the recommendations of this report, including recommended activities and associated costs (e.g., consultant cost, staff time, equipment). Footnotes are used to indicate where benchmarking data were used to guide recommendations.

NPDES Phase II Permit Requirements

The most significant regulatory requirement driving the City's SWMP is Ecology's NPDES Phase II Permit (Ecology 2013), which addresses a variety of issues associated with stormwater runoff and requires the City to develop several distinct Surface Water Management program components. The current NPDES Phase II Permit (issued by Ecology on August 1, 2012; effective on August 1, 2013) specifies requirements for the following components of the City's SWMP:

- Public education and outreach
- Public involvement and participation
- Illicit discharge detection and elimination (IDDE)
- Controlling runoff from new development, redevelopment, and construction sites
- Municipal maintenance and operations

The NPDES Phase II Permit also includes requirements for compliance with Total Maximum Daily Loads (TMDLs, which are regulatory limits on specific pollutants in runoff entering specific surface water bodies), monitoring and assessment, and reporting.

STORMWATER MANAGEMENT PROGRAM ASSESSMENT

RECOMMENDATIONS

The City has identified four tiers representing varied levels of service for the SWMP:

- Minimum (NPDES compliant)
- Future (NPDES compliant)
- Moderate
- Enhanced

The Minimum (NPDES compliant) tier represents the required minimum level of service and addresses the gaps identified between existing service levels and current NPDES Phase II Permit requirements.

The Future (NPDES compliant) tier represents the minimum service level expected for the 2019–2023 NPDES Phase II permit cycle based on the preliminary draft language that has been released for the 2019–2023 NPDES Phase II permit (Ecology 2017). This level of service may need to be modified when the final 2019–2023 NPDES Phase II permit is available.

The Moderate tier is not explicitly tied to NPDES Phase II permit requirements. This tier represents a middle ground between NPDES compliant minimum/future tiers and an enhanced tier level of service. This Moderate tier is intended to be a measurable benchmark where achievement means that the City is on track to reach an Enhanced level of service. This tier also incorporates the first steps towards an Asset Management program.

The Enhanced tier represents a complete set of tools, staffing, and equipment to fully reach the goals of an ideal SWMP. This tier would require a larger stormwater utility rate increase than the other tiers to enable it to be realized, but would also result in substantial benefits for the community and the surface water environment. This tier applies the data collected through an Asset

Management program towards developing a set of City projects to start repairing and replacing the all existing City stormwater assets overtime.

This section is generally organized by existing NPDES Phase II permit components followed by expected future NPDES Phase II permit components. Recommendations for an Asset Management program are included as one of the subsections under Maintenance and Operations (M&O). Each subsection includes a list of recommendations organized by program tier along with associated funding and staffing requirements to support those recommendations. Support for recommendations based on benchmarking results is included as footnotes in applicable tables.

Public Education and Outreach

Table 2 summarizes recommendations related to the SWMP requirements for public education and outreach (Section S5.C.1 of the NPDES Phase II Permit). A summary of the permit requirements and current activities is provided in Appendix B.

Table 2. Recommended Activities for Public Education and Outreach.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Minimum						
Identify or develop a new trackable program to replace Natural Yard Care	$20,000	60	$0	0	0	Assumes development of a new trackable program, 200 consultant hours at $100 per hour and 30 percent staff hours for project management. Staff that currently manage Natural Yard Care will take on the new program.
Minimum Tier Total	**$20,000**	**60**	**$0**	**0**	**0**	
Future						
All Public Education activities from Minimum tier	$20,000	60	$0	0	0	Same assumptions as Minimum
Future Tier Total	**$20,000**		**$0**	**0**	**0**	

Table 2 (continued). Recommended Activities for Public Education and Outreach.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Moderate						
All Public Education activities from Minimum tier	$20,000	60	$0	0	0	Same assumptions as Minimum
Update kiosk materials and attend events	$5,000	15	$0	40	0.02	Assumes 40 consultant hours at $100 per hour, plus $1,000 for material and 30 percent staff hours for project management. Assumes 4 events per year require 10 hours of staff time per event.
Reevaluate current education and outreach materials	$0	0	$0	40	0.02	1 day to review existing material. 4 days to update/develop new City-specific material leveraging new regional education material.
Social media outreach	$4,000	12	$0	192	0.11	Assumes 40 consultant hours at $100 per hour to develop promotional material and 30 percent staff hours for project management. Assumes 16 hours per month of staff time for 2 social media activities per month.
Engage residents/students to participate in Hall Lake fish hatchery once it is up and running	$0	0	$0	0	0	Use existing staff and funding to support, no additional staffing and funding needed.
Moderate Tier Total	**$29,000**	**87**	**$0**	**272**	**0.15**	
Enhanced						
All Public Education Activities from Minimum tier	$20,000	60	$0	0	0	Same assumptions as Minimum tier
Update kiosk materials and attend events	$5,000	15	$0	60	0	Same assumptions as Moderate tier
Develop new education and outreach materials	$0	0	$10,000	30	0.017	Assumes 100 consultant hours at $100 per hour on an annual basis and 30 percent staff hours for project management.

Table 2 (continued). Recommended Activities for Public Education and Outreach.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Enhanced (continued)						
Expand funding for Nature Vision program	$0	0	$5,000	40	0.02	Additional $5,000 per year to expand the program, which is currently $5,000 per year. Assumes 40 additional staff hours to manage the program
Increase the number of public education and outreach programs	$0	0	$10,000	442	0.25	Assumes 100 consultant hours at $100 per hour on an annual basis, plus 0.25 FTE City staff to present materials to the public
Expand social media outreach including developing a targeted campaign on ongoing outreach	$20,000	0	$0	442	0.25	Assumes 200 consultant hours at $100 per hour to provide recommended approach and initial campaign, plus 0.25 FTE City staff to implement program
Develop and implement an Adopt a Stream/Wetland or similar program	$0	0	$1,000	442	0.25	Assumes $1,000 for printed materials (brochures, signs, etc.), 0.25 FTE City staff to implement program
Expand rain garden program into an LID retrofit program that includes additional LID BMPs	$0	0	$5,000	884	0.5	Assumes $5,000 for printed materials (brochures, Rain Garden handbooks, etc.), 0.5 FTE City staff to implement program
Enhanced Tier Total	**$45,000**	**75**	**$31,000**	**2,340**	**1.32**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

NPDES = National Pollutant Discharge Elimination System

Public Involvement and Participation

Table 3 summarizes recommendations related to the SWMP requirements for public involvement and participation (Section S5.C.2 of the NPDES Phase II Permit). A summary of the permit requirements and current activities is provided in Appendix B. No gaps were identified for the Minimum (NPDES Compliant) or Future (NPDES Compliant) levels of service, so these tiers are not included in Table 3.

Table 3. Recommended Activities for Public Involvement and Participation.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Moderate						
Report out to Parks Advisory Board (citizen panel)	$0	0	$0	24	0.01	Assumes 2 meetings per year. Each requires 4 hours for meeting attendance and 8 hours for meeting preparation and correspondence.
Moderate Tier Total	**$0**	**0**	**$0**	**24**	**0.01**	
Enhanced						
Report out to Parks Advisory Board (same as Moderate)	$0	0	$0	24	0.01	Same assumptions as Moderate
Reactivate and engage Citizen Advisory Group	$0	0	$0	144	0.08	Assumes 12 meetings per year. Each requires 4 hours for meeting attendance and 8 hours for meeting preparation and correspondence.
Enhanced Tier Total	**$0**	**0**	**$0**	**168**	**0.10**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

Illicit Discharge Detection and Elimination

Table 4 summarizes recommendations related to the SWMP requirements for illicit discharge detection and elimination (Section S5.C.3 of the NPDES Phase II Permit). A summary of the permit requirements and current activities is provided in Appendix B.

Table 4. Recommended Activities for Illicit Discharge Detection and Elimination.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Minimum (NPDES Compliant)						
Modify catch basin inspection form to include illicit discharge checkbox	$0	0	$0	0	0	Use existing staff and funding to support; no additional staffing and funding needed
Develop and implement on-going IDDE training program for field staff	$4,000	12	$0	16	0.01	40 consultant hours at $100/hour to develop materials and present initial training and 30 percent staff hours for project management, annual staff time and needed to conduct future trainings
Minimum Tier Total	**$4,000**	**12**	**$0**	**16**	**0.01**	
Future (NPDES Compliant)						
All IDDE activities from Minimum tier	$4,000	12	$0	16	0.01	Same assumptions as Minimum
Future Tier Total	**$4,000**	**12**	**$0**	**16**	**0.01**	
Moderate						
All IDDE activities from Future (NPDES Compliant) tier	$4,000	12	$0	16	0.01	Same assumptions as Future (NPDES Compliant).
Develop a more formal training program for Fire Department and Building Inspectors	$4,000	12	$0	60	0.03	40 consultant hours at $100/hour to develop materials and present initial training with 15 percent staff hours for project management; annual staff time to update training material and conduct future trainings.

Table 4 (continued). Recommended Activities for Illicit Discharge Detection and Elimination.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Moderate (continued)						
Expand attribute data collected (storage volume, etc.)	$0	0	$0	196	0.11	Assumes inspection of the 4,700 CBs in the City at 5 minutes per CB.
Track IDDE issues through work orders and asset management	$0	0	$0	104	0.06	Assume 6 issues per year at 16 hours per issue and 8 hours per year for information management.
Moderate Tier Total	**$8,000**	**24**	**$0**	**376**	**0.21**	
Enhanced						
All IDDE activities from Moderate tier	$8,000	24	$0	376	0.21	Same assumptions as Moderate.
Review CCTV data collected as part of the asset management program for illicit connections	$0	0	$0	442	0.25	Includes staff time to review CCTV data for illicit connections. Funding for CCTV data collection included in the Maintenance and Operations: Asset Management program area.
Develop an enhanced internal IDDE training program	$0	0	$0	80	0.045	80 hours per year for staff to update the training material with lessons learned (20 hours), plan and administer training (20 hours), attend the training (40 hours for 10 staff x 4 hours).
Enhanced Tier Total	**$8,000**	**24**	**$0**	**898**	**0.51**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

IDDE = Illicit Discharge Detection and Elimination

NPDES = National Pollutant Discharge Elimination System

Controlling Runoff from New Development, Redevelopment, and Construction Sites

Table 5a and Table 5b summarize recommendations related to the SWMP requirements for controlling runoff from new development, redevelopment, and construction sites (Section S5.C.4 of the NPDES Phase II Permit). Table 5a includes recommendations related to engineering and development review and Table 5b includes recommendations related to M&O activities. Annual cost shown in Table 5b represents both labor and equipment. A summary of the permit requirements and current activities is provided in Appendix B.

Table 5a. Recommended SWMP Activities for Controlling Runoff from New Development, Redevelopment, and Construction Sites.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Minimum (NPDES Compliant)						
Document site plan review process for private Stormwater Site Plans. Implement the process.	$0	80	$0	100	0.06	Some documentation for City projects has been prepared as part of the SWMCP update. Includes one-time work for staff to develop documents that are specific to private site plans and implement the plans. Includes annual effort of 4 hours per project for 20 projects per year for documentation and 20 hours of staff time per year for annual process improvement.
Develop and adopt Supplemental Stormwater Guidelines.	$100,000	150	$0	320	0.18	Assume 1,000 consultant hours at $100/hour and 15 percent staff time to manage the project. Annual cost to review submittals against updated standards of 16 hours per project for 20 projects.

Table 5a (continued). Recommended SWMP Activities for Controlling Runoff from New Development, Redevelopment, and Construction Sites.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Minimum (NPDES Compliant) (continued)						
Update and develop new stormwater plan review checklist(s).	$15,000	80	$0	0	0	Assumes 150 consultant hours at $100/hour and 15 percent staff time to manage the project.
Document site plan review process for Public (CIP) Stormwater Site Plans. Implement the process.	$0	40	$0	340	0.19	A process has been defined for City projects as part of the SWMCP update. Includes one-time work for staff to implement the process. Includes annual effort of 16 hours per project for 20 projects per year in addition to 20 hours of staff time for annual process improvement.
Develop and implement on-going training program for plan reviewers, construction site inspectors, and private stormwater facility maintenance inspectors.	$8,000	24	$0	40	0.02	80 consultant hours at $100/hour and 30 percent staff time to manage the project to develop training material and conduct initial training. Includes annual staff time needed to update training material, conduct future trainings, and attend trainings.
Implement SFR stormwater facility inspection and maintenance program.[d]	$100	2,164	$0	857	0.48	Hours based on results of Task 5.2. compliance approach Alternative 3, where the City assumes responsibility for maintenance and operation of private facilities.
Minimum Tier Total	**$123,100**	**2,538**	**$0**	**1,657**	**0.94**	

Table 5a (continued). Recommended SWMP Activities for Controlling Runoff from New Development, Redevelopment, and Construction Sites.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Future (NPDES Compliant)						
All New Development, Redevelopment, and Construction Site activities from Minimum tier.	$123,100	2,538	$0	1,657	0.94	Same assumptions as Minimum.
Future Tier Total	**$123,100**	**2,538**	**$0**	**1,657**	**0.94**	
Moderate						
All New Development, Redevelopment, and Construction Site Activities from Minimum tier.	$123,100	2,538	$0	1,657	0.94	Same assumptions as Minimum.
Develop guidelines for feasibility and site testing.	$5,000	15	$0	0	0	50 consultant hours at $100/hour and 30 percent staff time for project management.
Provide LID technical assistance at the permit counter and assistance in the field.	$8,000	24	$0	80	0.05	80 consultant hours at $100/hour and 30 percent staff time for project management to develop materials, existing staff to support providing materials at permit counter. Assume assistance is provided to 10 projects per year and 8 hours per project.
Provide links to other resources on City website.	$0	8	$0	0	0	
Become more involved with project design and ramp-up to find opportunities for partnerships (retrofits, LID pilot projects, demonstration projects).	$0	0	$0	52	0.03	Assumes attendance at biweekly project coordination meeting takes 2 hours per meeting.

Table 5a (continued). Recommended SWMP Activities for Controlling Runoff from New Development, Redevelopment, and Construction Sites.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Moderate (continued)						
Modify/update construction site inspection checklists.[e]	$5,000	15	$0	0	0	50 consultant hours at $100/hour and 30 percent staff time for project management.
Require consultants conducting construction site inspections for public (CIP) projects to have CESCL training.	$0	0	$0	8	0.005	
Moderate Tier Total	**$141,100**	**2,600**	**$0**	**1,797**	**1.02**	
Enhanced						
All New Development, Redevelopment, and Construction Site Activities from Moderate tier.	$141,100	2,600	$0	1,797	1.02	Same assumptions as Moderate.
Expand the LID toolkit (resource list, modeling software training, and videos).	$20,000	30	$0	8	0.005	200 consultant hours at $100/hour and 15 percent staff time for project management to provide list of recommendations, City staff time needed to add resource links to website.
Enhanced Tier Total	**$161,100**	**2,630**	**$0**	**1,805**	**1.02**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

[d] Of the five cities contacted during benchmarking, four cities are inspecting all private facilities, including older facilities. In the City of Bothell, older facilities are inspected regularly but less frequently than new facilities. The City of Vancouver received a grant from Ecology to pay for 1 FTE to inspect all historic private facilities in 2 years.

[e] All five cities contacted during benchmarking have site inspection checklists, either developed in-house or adopted from King County.

CESCL = Certified Erosion and Sediment Control Lead
CIP = Capital Improvement Program
LID = Low Impact Development
NPDES = National Pollutant Discharge Elimination System

Table 5b. Recommended Maintenance and Operations Activities for Controlling Runoff from New Development, Redevelopment, and Construction Sites.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding[c]	Staff Support (hours/year)	FTE[d]	
Minimum						
Annual work to implement SFR inspection and maintenance program	$0	0	$52,220	0	0	Average annual cost to maintain private stormwater ponds during first 5 years based on results of Task 5.2. compliance approach Alternative 3, where the City assumes responsibility for maintenance and operation of private facilities.
Minimum Tier Total	**$0**	**0**	**$52,220**	**0**	**0**	
Future						
All New Development, Redevelopment, and Construction Site Activities from Minimum tier	$0	0	$52,220	0	0	Same assumptions as Minimum.
Future Tier Total	**$0**		**$52,220**	**0**	**0**	
Moderate						
All New Development, Redevelopment, and Construction Site Activities from Minimum tier	$0	0	$52,220	0	0	Same assumptions as Minimum.
Moderate Tier Total	**$0**	**0**	**$52,220**	**0**	**0**	
Enhanced						
All New Development, Redevelopment, and Construction Site Activities from Minimum tier	$0	0	$52,220	0	0	Same assumptions as Minimum.
Enhanced Tier Total	**$0**	**0**	**$52,220**	**0**	**0**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] Ongoing costs are a combination of staff time and equipment usage to conduct maintenance of stormwater facilities serving single-family residential developments.

[d] FTE = Full time equivalent City staff.

CESCL = Certified Erosion and Sediment Control Lead
CIP = Capital Improvement Program
HOA = Homeowner's Association
LID = Low Impact Development
NPDES = National Pollutant Discharge Elimination System

Municipal Maintenance and Operations

The municipal maintenance and operations (M&O) recommendations are organized into three categories:

- Inspections and Maintenance of Stormwater Facilities
- Documentation
- Asset Management

Inspections and Maintenance of Stormwater Facilities

Table 6 summarizes recommendations related to routine inspection and maintenance requirements for municipal M&O (Section S5.C.5 of the NPDES Phase II Permit). Training and mapping requirements are also included as part of these recommendations. A summary of the permit requirements and current activities is provided in Appendix B.

Table 6. Recommended Activities for Inspections and Maintenance of Stormwater Facilities.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Minimum (NPDES Compliant)						
Increase inspection frequency of all City-owned flow control and water quality treatment stormwater facilities to annual	$0	0	$0	300	0.17	Increase inspection frequency of detention tank/vault/pipe, media filter vaults, and oil/water separators to annually. 130 facilities estimated to take approximately 300 hours more than current level of effort.
Develop M&O manuals for City-owned flow control and water quality treatment stormwater facilities	$40,000	120	$0	80	0.05	100 facilities need M&O Manuals (number of facilities expected to increase due to unmapped facilities), develop template for each BMP type, gather site specific info, apply to 100 facilities, 400 consultant hours at $100/hour and 15 percent staff hours to manage the project, City staff support for initial review (and update in subsequent years).
Ongoing training program to select appropriate BMPs, prevent or minimize water quality impacts, and reporting procedures	$4,000	12	$0	160	0.09	40 consultant hours at $100/hour and 30 percent staff hours to manage the project to develop materials and present initial training; existing staff and funding to conduct future trainings. Assumes 20 staff trained per year and time charged to SW utility.
Maintain water quality and flow control facilities per SWMMWW standards and NPDES permit timelines	$0	0	$8,000	80	0.05	Will need to increase inspection frequency of detention tank/vault/pipe, media filter vaults, and oil/water separators to annually. 130 facilities estimated to take approximately 300 hours.
Minimum Tier Total	**$44,000**	**132**	**$8,000**	**620**	**0.35**	

Table 6 (continued). Recommended Activities for Inspections and Maintenance of Stormwater Facilities.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Future (NPDES Compliant)						
All Routine Inspections and Maintenance activities (same as Minimum tier)	$44,000	132	$8,000	620	0.35	Same assumptions as Minimum.
Future Tier Total	**$44,000**	**132**	**$8,000**	**620**	**0.35**	
Moderate						
All Routine Inspections and Maintenance Activities (same as Minimum)	$44,000	132	$8,000	620	0.35	Same assumptions as Minimum.
Document results of each catch basin inspection so that the catch basin inspection and cleaning schedule can be optimized	$0	0	$0	442	0.25	4 to 6 years of improved documentation to justify a more strategic and lower cost inspection schedule afterwards.
Ongoing training program (expanded from Minimum to include LID facility inspections and maintenance)	$4,000	12	$0	16	0.01	40 consultant hours at $100/hour to develop additional curriculum and 30 percent staff time for project management, plus the 40 consultant hours included for the Minimum training program to develop materials and present initial training, additional staff time needed to conduct future trainings.
Seasonal vegetation maintenance for bioretention facilities	$0	0	$0	320	0.18	Assumes 4 weeks per year (1 week per season) x 2 staff, no additional equipment needed.
Moderate Tier Total	**$48,000**	**144**	**$8,000**	**1,398**	**0.79**	

Table 6 (continued). Recommended Activities for Inspections and Maintenance of Stormwater Facilities.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Enhanced						
All Routine Inspections and Maintenance Activities from Moderate tier	$48,000	144	$8,000	1,398	0.79	Same assumptions as Moderate.
Purchase equipment for maintaining permeable pavement	$150,000	0	$0	442	0.25	Triverus Municipal Cleaning Vehicle = $225K, Cyclone Technology = $135-146K, Cyclone trailer = $50K, Cyclone walk-behind = $13K; assume middle of the road equipment and 0.25 FTE staff time for operation.
Enhanced Tier Total	**$198,000**	**144**	**$8,000**	**1,840**	**1.04**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

BMPs = Best Management Practices

M&O = Maintenance and Operations

NPDES = National Pollutant Discharge Elimination System

SWMMWW = Stormwater Management Manual for Western Washington

Documentation

Table 7 summarizes recommendations related to the documentation requirements for municipal M&O (Section S5.C.5 of the NPDES Phase II Permit). A summary of the permit requirements and current activities is provided in Appendix B.

Table 7. Recommended Activities for M&O Documentation.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Minimum (NPDES Compliant)						
Update municipal Stormwater Pollution Prevention Plans (SWPPPs) for the UMC and WWTP	$4,000	12	$0	0	0.00	40 consultant hours at $100/hour and 30 percent staff time for project management to update SWPPPs.
Conduct wet and dry weather inspection as outlined in the SWPPPs for the UMC and WWTP	$0	0	$0	80	0.04	The SWPPP for the UMC and the WWTP requires quarterly inspections during storm events and one dry-weather inspection each year of all BMPs (8 hours assumed per sampling event).
Update spill history record for the UMC and WWTP	$0	4	$0	0	0.00	
Develop Standard Operating Procedures (SOPs) for City activities	$0	120	$0	16	0.01	Assuming all 15 generic activities in the NPDES permit apply and that SOPs are developed for each activity, assume 8 hours per facility to develop SOPs.
Minimum Tier Total	**$4,000**	**136**	**$0**	**96**	**0.05**	
Future (NPDES Compliant)						
All M&O Documentation Activities from Minimum tier	$4,000	136	$0	96	0.05	Same assumptions as Minimum.
Update SOPs if permit changes occur	$0	0	$0	0	0	Use existing staff and funding to support; no additional staffing and funding needed.
Future Tier Total	**$4,000**	**136**	**$0**	**96**	**0.05**	

Table 7 (continued). Recommended Activities for M&O Documentation.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Moderate						
All M&O Documentation Activities from Minimum tier	$4,000	136	$0	96	0.05	Same assumptions as Minimum.
Review and update SWPPPs for the UMC and WWTP if operations or storage at the facilities changes, or if significant staffing changes occur	$0	0	$0	16	0.01	
Review and update SOPs every 5 years	$0	0	$0	16	0.01	Depends on above.
Tablets and software for data collection in the field (funding included in Recordkeeping program area)	$0	0	$0	80	0.05	5 staff times 16 hours of training per staff. Funding for tablets and software included in Recordkeeping program area.
Moderate Tier Total	**$4,000**	**136**	**$0**	**208**	**0.12**	
Enhanced						
All M&O Documentation activities from Moderate tier	$4,000	136	$0	208	0.12	Same assumptions as Moderate.
Enhanced Tier Total	**$4,000**	**136**	**$0**	**208**	**0.12**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

NPDES = National Pollutant Discharge Elimination System

SOPs = Standard Operating Procedures

SWPPPs = Stormwater Pollution Prevention Plan

UMC = Utilities Maintenance Center

WWTP = Wastewater Treatment Plant

Asset Management

Table 8 summarizes recommendations related to the establishment of an Asset Management program at the Moderate and Enhanced tiers. Asset Management is not currently a NPDES Phase II permit requirement, thus Minimum (NPDES Compliant) and Future (NPDES Compliant) are not included in Table 8. However, the SWMCP will have an Asset Management capital improvement project that needs to be included in the Minimum tier because it includes a necessary update to the public stormwater system map. Asset Management is included in this section because it would primarily be implemented by M&O staff with assistance from other Surface Water Management staff.

Table 8. Recommended Activities for Asset Management.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Moderate						
Enter and manage all stormwater facility and conveyance data, prioritize and schedule inspections[d]	$0	0	$0	1,768	1.00	Assumes a full FTE during the data collection phase of the Asset Management Program. Staff time may be reduced after initial system inspection is complete. This staff member may be housed in Surface Water Management/Engineering, but kept with the mapping requirements (under M&O) for now.
Hire a contractor/set up a small works contract to collect field data (measurements and CCTV)[d]	$0	0	$300,000	450	0.25	Assumes that a contractor is hired and no City equipment purchase is needed, $300K cost may decrease for future rounds/reinspections. Annual staff hours are assumed for management of the contract.
Moderate Tier Total	**$0**	**0**	**$300,000**	**2,218**	**1.25**	

Table 8 (continued). Recommended Activities for Asset Management.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Enhanced						
Collect Data						
All Data Collection activities from Moderate tier	$0		$300,000	2,218	1.25	
Analyze/Manage Data						
Prioritize maintenance and CIPs based on asset inventory attributes[e]	$0	0	$0	265	0.15	0.15 FTE, this staff member may be housed in Surface Water Management/Engineering, but kept under M&O for now.
Add replacement/repair projects to City's Surface Water CIP list	$0	0	$0	265	0.15	0.15 FTE, this staff member may be housed in Surface Water Management/Engineering, but kept under M&O for now.
Enhanced Tier Total	**$0**	**0**	**$300,000**	**2,748**	**1.55**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

[d] Of the five cities contacted during benchmarking, four cities have a CCTV data collection program, and the fifth (The City of Edmonds) is starting one this year. Analysis of data and linking of data to asset management is less common: two of five perform criticality analysis, only one of five (The City of Kirkland) stores data in asset management software.

[e] Of the five cities contacted during benchmarking, two use asset management software with lifecycle analysis capacity. Another two are planning on starting asset management programs with lifecycle analysis soon.

CCTV = Closed Circuit Television

CIP = Capital Improvement Program

NPDES = National Pollutant Discharge Elimination System

Compliance with Total Maximum Daily Load Requirements

A summary of the permit requirements and current activities associated with TMDL compliance is provided in Appendix B. No gaps were identified related to the Minimum (NPDES Compliant), Future (NPDES Compliant), Moderate, or Enhanced tiers.

Compliance with Monitoring and Assessment

Similar to many other permittees, the City participates in the Regional Stormwater Monitoring Program (RSMP) instead of conducting their own stormwater monitoring to meet the conditions of Section S8 of the NPDES Phase II permit. There were no gaps identified related to this section of the NPDES Phase II permit; however, the costs for participating in this monitoring program are currently $25,000 per year. The costs may change over time as the City population and the RSMP change.

Reporting

Table 9 summarizes recommendations related to the SWMP requirements for reporting and recordkeeping (Section S9 of the NPDES Phase II Permit). A summary of the permit requirements and current activities is provided in Appendix B.

Table 9. Recommended Activities for Reporting.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Minimum (NPDES Compliant)						
No gaps identified.	$0	0	$0	0	0	
Minimum Tier Total	**$0**	**0**	**$0**	**0**	**0**	
Future (NPDES Compliant)						
No gaps identified.	$0	0	$0	0	0	Same assumptions as Minimum.
Future Tier Total	**$0**	**0**	**$0**	**0**	**0**	
Moderate						
Tablets and software for data collection in the field. No paper forms or manual data entry.[d]	$5,000	0	$3,000	0	0	Assumes 5 iPads with waterproof Otter box and tempered glass and 2-year AppleCare++ protection plan, annual ESRI license for 5 users. Training for M&O and inspectors included under those program areas.
Develop recordkeeping guidelines and requirements.	$0	0	$0	80	0.05	Assumes ongoing work to prepare and update (80 hours per year).
QA/QC procedures/checks.	$0	0	$0	160	0.09	Assumes ongoing work to implement (40 hours per quarter).
Develop and implement consistent project closeout procedures and nomenclature/project naming.	$0	884	$0	442	0.25	Assumes dedicated staff to implement improved project closeout procedures.
Moderate Tier Total	**$5,000**	**884**	**$3,000**	**682**	**0.39**	

Table 9 (continued). Recommended Activities for Reporting.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Enhanced						
All Record Keeping activities from Moderate tier.	$5,000	884	$3,000	682	0.39	Same assumptions as Moderate.
Enhanced Tier Total	**$5,000**	**884**	**$3,000**	**682**	**0.39**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

[d] Of the five cities contacted during benchmarking, four cities use tablets or laptops to collect data in the field. Three of five have been using tablets since 2013. These cities recommend initiating a pilot test period with different devices. Furthermore, successful cities said that using tablets or laptops will not reduce time spend in the field or crew size, but will allow for more detailed inspections.

NPDES = National Pollutant Discharge Elimination System

QA/QC = Quality Assurance/Quality Control

Watershed Planning

Table 10 summarizes recommendations related to anticipated requirements for watershed planning in the 2019–2023 NPDES Phase II permit. A summary of the preliminary draft permit requirements is provided in Appendix B. Implementation of watershed planning is not currently a NPDES Phase II permit requirement for all Phase II permittees, thus Minimum (NPDES Compliant) is not included in Table 10.

Table 10. Recommended Activities for Watershed Planning.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Future (NPDES Compliant)						
Priority watershed plan development	$100,000	442	$0	0	0	Assumes $100,000 planning effort with consultant support and one-time City staff time estimated at 0.25 FTE. Additional City staff time is included for possible revisions and modifications to the previously prepared plan on the Scriber Creek Corridor.
Future Tier Total	**$100,000**	**442**	**$0**	**0**	**0**	
Moderate						
Same as Future (NPDES Compliant)	$100,000	442	$0	0	0	Same assumptions as Future (NPDES Compliant).
Moderate Tier Total	**$100,000**	**442**	**$0**	**0**	**0**	
Enhanced						
Same as Future (NPDES Compliant)	$100,000	442	$0	0	0	Same assumptions as Future (NPDES Compliant).
Enhanced Tier Total	**$100,000**	**442**	**$0**	**0**	**0**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

NPDES = National Pollutant Discharge Elimination System

Source Control Program for Existing Development

Table 11 summarizes recommendations related to anticipated requirements for a source control program for existing development in the 2019–2023 NPDES Phase II permit. A summary of the preliminary draft permit requirements is provided in Appendix B. Implementation of a source control program is not currently a NPDES Phase II permit requirement, thus Minimum (NPDES Compliant) is not included in Table 11.

Table 11. Recommended Activities for Source Control Program for Existing Development.

Recommendation	One-Time[a]		Ongoing[b]			Assumptions
	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	
Future (NPDES Compliant)						
Develop and maintain source control inventory	$0	442	$0	40	0.02	Dedicated initial staff time to develop the inventory and update the inventory annually.
Develop ordinance and enforcement policy	$0	0	$0	80	0.05	Assumes ongoing work to review and update the ordinance.
Develop and implement on-going training program	$8,000	24	$0	180	0.1	80 consultant hours at $100/hour and 30 percent staff time for project management to develop materials and present initial training, 0.10 FTE to conduct future trainings and research/attend external trainings.
Implement business inspection program	$0	0	$0	884	0.5	Assumes 0.5 FTE for implementation (this wouldn't start until late 2021, permit deadline will most likely be January 1, 2022, for implementing the program).
Future Tier Total	**$8,000**	**466**	**$0**	**1,184**	**0.67**	
Moderate						
Same as Future (NPDES Compliant)	$8,000	466	$0	1,184	0.67	Same assumptions as Future (NPDES Compliant).
Moderate Tier Total	**$8,000**	**466**	**$0**	**1,184**	**0.67**	

Table 11 (continued). Recommended Activities for Source Control Program for Existing Development.						
	One-Time[a]		Ongoing[b]			
Recommendation	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]	Assumptions
Enhanced						
Same as Future (NPDES Compliant)	$8,000	466	$0	1,184	0.67	Same assumptions as Future (NPDES Compliant).
Enhanced Tier Total	**$8,000**	**466**	**$0**	**1,184**	**0.67**	

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

NPDES = National Pollutant Discharge Elimination System

STAFFING AND EQUIPMENT

Based on the analysis presented above, to achieve the Minimum (NPDES Compliant) tier of service, more than one FTE is needed to cover ongoing (annual) needs plus more than 12 one-time projects that will require an additional 2,878 hours of staff time and $195,000. The greatest needs are in the areas of stormwater site plan review for private and public projects, inspection and maintenance of privately owned stormwater facilities (particularly facilities that serve single-family residential developments), and inspection, maintenance, and documentation for public stormwater infrastructure. To meet the Future (NPDES Compliant) tier, the staffing need increases to over two FTEs, plus nearly 4,000 hours of staff time and more than $300,000 in funding for one-time projects. In addition to the list of greatest needs described above for meeting the Minimum tier of service, these additional resources will be used to address implementation of a source control program for existing development and anticipated basin planning requirements. The Moderate tier requires additional staffing and funding (more than four FTEs and more than $300,000 on an ongoing basis and nearly 5,000 hours and more than $300,000 for one-time projects) to support expanded public education and outreach, development of stormwater plan review tools, and implementation of an asset management program. The Enhanced tier requires additional staffing and funding (almost seven FTEs and nearly $400,000 on an ongoing basis and nearly 5,000 hours and more than $500,000 for one-time projects) to support enhancements in almost all aspects of the City's stormwater management program. Table 12 presents a summary of the staffing and funding recommendations for each of the four tiers.

The only new equipment needs included in Table 12 are computer tablets and software for data collection that is included in the Moderate tier (one-time cost of $5,000 and an annual cost of $3,000). These costs plus permeable pavement maintenance equipment (one-time cost of $150,000) are included in the Enhanced tier.

Table 12. Summary of Staffing and Equipment Needs.					
	One-Time[a]		Ongoing[b]		
Program Area	Funding	Staff Support (hours)	Funding	Staff Support (hours/year)	FTE[c]
Minimum (NPDES Compliant)					
M&O	$48,000	268	$60,220	716	0.40
SWMP	$147,100	2,610	$0	1,673	0.95
Minimum Tier Total	**$195,000**	**2,878**	**$60,220**	**2,389**	**1.35**
Future (NPDES Compliant)					
M&O	$48,000	268	$60,220	716	0.40
SWMP	$255,100	3,518	$0	2,857	1.62
Future Tier Total	**$303,100**	**3,786**	**$60,220**	**3,573**	**2.02**
Moderate					
M&O	$52,000	280	$360,220	3,824	2.16
SWMP	$291,100	4,503	$3,000	4,335	2.45
Moderate Tier Total	**$343,100**	**4,783**	**$363,220**	**8,159**	**4.61**
Enhanced					
M&O	$202,000	280	$360,220	4,796	2.71
SWMP	$327,100	4,521	$34,000	7,077	4.00
Enhanced Tier Total	**$529,100**	**4,801**	**$394,220**	**11,873**	**6.71**

[a] One-Time = Funding and staffing required for a discrete project.

[b] Ongoing = Funding and staffing required annually to support an ongoing or recurring activity. Staffing is expressed in hours/year and FTE to support calculation of FTE needs for ongoing activities.

[c] FTE = Full time equivalent City staff.

M&O = Maintenance and Operations

NPDES = National Pollutant Discharge Elimination System

SWMP = Surface Water Management Program

UTILITY RATE STRUCTURE

This section provides a summary of the City's existing surface water utility rate structure and charges. The City's existing surface water utility rates are based on an equivalent service unit of 2,900 square feet of imperious surface. Alternatives utility rate structures will not be evaluated during the course of work on the Surface Water Management Comprehensive Plan; however, a potential rate credit may be evaluated in association with policies related to inspection and maintenance of private facilities.

Current surface water utility rates are provided on the City website (Lynnwood 2016b) and are summarized in Table 13.

Table 13. Summary of City of Lynnwood Surface Water Utility Rates.							
		Bimonthly Stormwater Rate[a]					
Category	Type	2017	2018	2019	2020	2021	2022
Residential	Single-Family/ Duplex	$23.70	$25.47	$26.24	$27.03	$27.84	$28.67
Residential	Multifamily & Mobile	$23.70/ERU	$25.47/ERU	$26.24/ERU	$27.03/ERU	$27.84/ERU	$28.67/ERU
Commercial/ Industrial	Commercial	$23.70/ERU	$25.47/ERU	$26.24/ERU	$27.03/ERU	$27.84/ERU	$28.67/ERU
Commercial/ Industrial	Industrial	$23.70/ERU	$25.47/ERU	$26.24/ERU	$27.03/ERU	$27.84/ERU	$28.67/ERU

ERU = equivalent residential unit

[a] Of the five cities contacted during benchmarking, four cities offered credits for design based on existing impervious area, rain water harvesting systems, preserving existing vegetation, and/or properly maintaining private facilities.

CONCLUSIONS

As part of the Surface Water Management Comprehensive Plan update, an implementation plan will be developed for the activities defined in this document and a financial analysis will be conducted to determine the surface water utility rate increase that is required to support the activities in each of the tiers. This will enable decision makers to select a preferred tier of service based on evaluation of anticipated performance and cost.

REFERENCES

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Ecology. 2017. Source Control Program for Existing Development (WWA Phase II) Preliminary Draft Fact Sheet. Issued by the Washington State Department of Ecology, Olympia, Washington. October 11.

Herrera. 2017. Draft Surface Water Management Program Benchmarking Results Technical Memorandum. Prepared for the City of Lynnwood, Washington, by Herrera Environmental Consultants, Inc., Seattle, Washington.

Stormwater Partners of Southwest Washington. <http://www.stormwaterpartners.com/partners.html>.

APPENDIX A

Gap Analysis Questionnaire

City of Lynnwood Surface Water Comprehensive Plan Questionnaire

Instructions: Please assist us by looking over this questionnaire and providing responses to questions in your area of expertise (no need to respond to every question) using track changes. Please provide as much readily-available information as you can, and identify any specific references you recommend we review later, such as brochures, City Code, records, or other City documents. There is no need to conduct any in-depth research to respond to these questions – please just provide what you know and identify where more research would help fill in any gaps. Then save a new copy of the document with your initials in the file name and send it back to Matt Fontaine mfontaine@herrerainc.com by **Thursday, April 13th**.

Contents

Background

The City has embarked on an effort develop a new Surface Water Management Comprehensive Plan, which will provide a needed update and strategic guidance for the Surface Water Utility and its programs. The completed Surface Water Comprehensive Plan will provide a roadmap for the City's surface water utility for the next six to twenty years.

The Big Picture

Overall Purpose of the Plan

1. What are the City's top issues with stormwater management?

2. What should be the City's top priorities for stormwater management?

3. Which staff from the City will use this plan?

Water Resources and Pollutants of Concern

4. What are the City's priorities for water quality and resource protection (what resources or waterbodies)?

5. What do you perceive as the biggest threats to stormwater quality (e.g., runoff from commercial areas, pollutants from roadways, sediment from construction sites, other)?

6. What geographic areas or resources are most vulnerable to these threats (e.g., critical areas, endangered species, waterbodies listed above)?

Stormwater Program

General Stormwater Program Status

7. What elements of the current stormwater program/approach work well?

8. What elements don't work well, and what changes are needed?

Public Education and Outreach

9. What types of educational brochures related to stormwater has the City developed and how are they distributed?

10. How does the City evaluate educational and outreach programs? What programs are most successful and least successful?

Public Involvement and Participation

11. What are the established stakeholder groups that City officials consult with regarding stormwater?

12. How does the City solicit input and process comments on the stormwater program?

13. Does the City have a system (phone number, website, etc.) for the public to log general stormwater related complaints (e.g., drainage problems, construction site runoff)? How is this communication system advertised? How does the City respond to calls from the public?

Illicit Discharge Elimination and Pollutant Source Control

14. Has the City ever taken enforcement action against a citizen for non-stormwater discharge to the storm drain system?

15. Have there been known or suspected illicit discharges in the City? How were they identified? Has the City taken any action against these offenders?

16. Is there a hotline specifically for reporting illicit discharges? If so, how is it publicized? How many calls are received per year on average?

17. What are the City's thoughts on the new IDDE field screening requirements *(complete field screening for at least 40% of the MS4 by Dec. 31, 2017 and 12% each year thereafter*) in the Phase II permit?

18. Are there any areas where illicit discharges are perceived as a problem?

19. What land uses and industries are viewed as priority sources of stormwater pollution in the City?

20. Has the City run into any challenges with implementing the illicit discharge detection and elimination program?

21. Have your outfall inspections been successful? Have the results been useful?

22. Does the City keep records of spills?

Controlling Runoff from New Development, Redevelopment and Construction Sites

23. What type and quantity of development has occurred in the City over the last 10 years (the more detail the better)?

24. What type of development is expected in the next 10 years?

25. Have you had any challenges in implementing the Stormwater Management Manual for Western Washington?

26. How does the City verify facility performance during plan review (e.g., modeling, calculations, and professional judgment)? Would this system benefit from tools that could increase efficiency (e.g., checklists, sizing tables, etc.)?

27. Who inspects erosion control on development sites and are erosion control measures usually implemented correctly? What does the City do when they are not?

Monitoring

28. What are the City's thoughts on the regional stormwater monitoring program (RSMP) outlined in the Phase II permit?

Miscellaneous topics
(groundwater, wellheads, critical areas, Endangered Species Act [ESA])

29. Are there any perceived threats to groundwater quality or quantity that should be evaluated as part of this project?

30. Does the City assess stormwater impacts on listed species when making land use decisions?

31. Are ESA issues a major concern to external stakeholder groups?

32. What challenges do ESA considerations create for stormwater management in the City?

33. Does the City coordinate its ESA compliance strategy with other agencies (e.g., neighboring counties, neighboring cities, Washington Dept. of Fish and Wildlife [WDFW])?

O&M and Asset Management

Stormwater Maintenance Activities

34. Does the City ensure that maintenance is performed on private stormwater facilities? If so, how is that accomplished (e.g., additional education, code, maintenance covenants, plat documents)?

35. Is lack of facility maintenance viewed as a problem that contributes to flooding and poor water quality in the City? How severe are the problems (e.g., major, moderate, minor)?

36. Does the City stormwater system map have any significant information gaps or inaccuracies?

37. Does the City maintain a list of maintenance problem locations (e.g., places that maintenance staff check on during and/or following major storms – aka Spot Check List)?

38. How often do maintenance staff check these locations?

39. How frequently are stormwater facilities (e.g., ponds, vaults, pipes) inspected?

    - City owned or operated facilities?

    - Privately owned facilities?

40. How are records kept?

41. How many full time equivalent personnel are currently required to meet City storm drainage system maintenance needs?

42. How much is spent on contractors and equipment to maintain the system (i.e., Vactors, sweepers etc.)?

43. Does the City operate any facilities that could generate pollution (e.g., fleet vehicle yards, maintenance shops, parking garages)? What pollutant generating activities occur at these facilities (e.g., stockpiling, vehicle maintenance, vehicle washing)?

44. Do street and stormwater maintenance staff adhere to any BMPs or guidelines (e.g., perform vehicle maintenance indoors, wash vehicles at a commercial carwash facility, cover material stockpiles) to prevent pollution of the stormwater system? Which ones?

45. How much staff time is used in implementing the Stormwater Pollution Prevention Plan (SWPPP) for the Maintenance Facility? Have any revisions been made to the SWPPP? Are there any other City facilities which may need a SWPPP?

46. Are standard operating procedures (SOPs) and guidelines in place for operations and maintenance staff for preventing stormwater pollution outside of City-owned facilities?

47. What is the City's current street sweeping schedule/program? Does the City plan to expand, reduce, or continue this program at the same level of effort?

48. What is the City's current catch basin inspection schedule/program?

49. How has the City been meeting the new catch basin inspection options in the 2013-2018 Phase II permit: 1) inspecting catch basins least once by August 1, 2017 and every two years thereafter (unless reduced frequency can be documented), 2) inspecting catch basins on a circuit basis at least once every two years, or 3) cleaning the entire MS4 within a circuit (including all conveyances and catch basins) once during the permit term.

50. How many catch basins, culverts, stormwater facilities (e.g., Contech Filters, Vortechs, Aquaswirls, etc.) does the City maintain?

51. How many miles of open ditches and storm lines does the City maintain?

52. Does the City currently have the needed vehicles and equipment to maintain the stormwater system?

Stormwater Asset Management

53. Does the City have an active asset management program for its owned or operated stormwater infrastructure to determine lifespan and repair/replacement needs?

54. What types of assets or structures are regularly evaluated?

55. How are these assets evaluated and how often?

56. How often are underground assets (i.e., pipes, vaults, tanks etc.) evaluated?

57. Does the City have a repair or replacement schedule for its aging infrastructure?

58. Are existing funding sources adequate for the utility's repair and replacement needs – currently and in the future?

Capital Improvement Program (CIP)

59. Confirm that the following CIP projects identified in the 2009 Surface Water Comprehensive Plan will be removed from the CIP list. *(please fill in or amend the table as needed.)*

Problem #	Project Description	Status	Notes
FL-8	Install backflow preventers and construct berms upstream of 200th Street SW and 50th Ave W		
WQ-1	Alum Treatment for Scriber Lake	2017-2022 CFP indicates budget in 2017 through 2020	

60. Confirm that the following list of CIP projects identified in the 2009 Surface Water Comprehensive Plan have been completed. Are there any updates to the timeline shown in the 2017-2022 CFP? *(please fill in or amend the table as needed.)*

Problem #	Project Description	Status	Notes
ER-1	Stabilize approximately 200 linear feet of stream channel between 191st Street SW and 193rd Place SW with grade control structures made of logs and boulders	Completed as part of a different project	
FL-6	Maple Road and Ash Way drainage improvements	Design completed. 2017-2022 CFP indicates budget for construction in 2017	

61. Confirm the status of the CIP projects identified in the 2016 Scriber Creek Corridor Management Plan, Alternative B+. The order of projects listed corresponds to the recommended implementation order in the Scriber Creek Plan. Are there any updates to the timeline shown in the 2017-2022 CFP? *(please fill in or amend the table as needed.)*

Problem #	**Project Description**	**Status**	**Notes**
10	188th Street SW Flood Wall	2017-2022 CFP indicates budget in 2017, however, CFP calls this a "culvert" project.	
4	Raise Old 196th Street SW		
5	Parkview Plaza Culvert Replacement		
6	Scriber Creek Culvert Replacement at Casa Del Rey Condominiums Driveway		2009 SWCP FL-7
2	Remove Diversion Structure and Oil/Water Separator downstream of 196th Street SW		
11	Maximize off-channel Storage on the property north of 188th Street SW		
12	Install small berms near Eunia Plaza and Flynn's Carpet Cents		
9a, FL-4	Replace 191st Street SW Culvert	2017-2022 CFP indicates budget in 2018	2009 SWCP FL-4
9b, FL-3	Replace 190th Street SW Culvert	2017-2022 CFP indicates budget in 2018	2009 SWCP FL-3
9c, FL-2	Replace 189th Street SW Culvert	2017-2022 CFP indicates budget in 2018	2009 SWCP FL-2
8	(Programmatic) Acquire Frequently Flooded Properties between 188th Street and 191st Street		

62. Confirm that the following CIP projects from the 2009 Surface Water Comprehensive Plan should be updated for inclusion in the new Plan. What additional development is needed, including cost updates? Are there any updates to the timeline shown in the 2017-2022 CFP? *(please fill in or amend the table as needed.)*

Problem #	**Project Description**	**Status**	**Notes**
WQ-2	Street edge runoff treatment retrofits in the Hall Lake basin	2017-2022 CFP indicates budget in 2022	Identify specific streets for next project
WQ-3	Installation of a street edge or parking lot treatment system such as a BacterraTM bioretention system and Drainage ditch retrofit to a create a bioretention swale in the Golde Creek basin	2017-2022 CFP indicates budget in 2022	
WQ-4	Conversion of existing unimproved ditch to a bioretention swale along 180th St. SW between SR 99 and Scriber Creek	2017-2022 CFP indicates budget in 2022	
ER-2	Stabilize approximately 1,000 linear feet of streambank using bioengineering techniques		Project is on private property
FL-5	44th Avenue W. roadway raising at Scriber Creek crossing	Phase 2 budgeted in 2017-2022 CFP for 2021.	

63. Describe any new problems that need to be addressed in the Plan update. What capital improvement projects are needed that are not addressed in this list? What problems will they address?

64. Are there any major roadblocks to execution of any outstanding projects?

65. Are there any known problem areas that are not listed that would benefit from additional investigation or evaluation?

66. Describe problems or environmental conditions that warrant additional study (e.g. Lund's Gulch, Perrinville Creek, other parts of the City).

67. How are stormwater CIPs currently funded?

68. Is there a need to change that funding source?

Stormwater & Private Property

70. What is the City's current policy (written or unwritten) to determine whether the City will spend surface water utility funds on private property?

71. Has the City considered alternatives to this policy? If so, what are they?

72. Are you aware of or can you recommend alternative policies? If so, what are they?

73. What factors should be considered when evaluating alternatives to the existing policy (i.e., cost, staff time, liability, etc.)? Please explain.

Program Staffing and Funding

74. How much contract staff time is allocated to stormwater management, including stormwater design plan review?

75. How much contract staff time is currently allocated to operation and maintenance of the stormwater system?

76. What are the most important aspects of your utility that need additional funding?

- ☐ Current NPDES permit compliance
- ☐ Future NPDES permit compliance
- ☐ Operations and maintenance
- ☐ Water quality assessment/prioritization
- ☐ Stormwater Management Plan/CIP update
- ☐ Water quality capital projects
- ☐ Drainage/flood control capital projects

77. Which of the following funding sources are currently used to fund stormwater management program activities?

- ☐ Stormwater Utility
- ☐ Grants
- ☐ Loans
- ☐ Development review (permit) fees
- ☐ Revenue bonds for CIP projects
- ☐ Fee in-lieu of on-site stormwater control (to pay for regional stormwater facilities)
- ☐ General fund
- ☐ Special Purpose / Local Improvement District(s)
- ☐ Drainage for Flood Control Zone District(s)
- ☐ System development charges
- ☐ Intergovernmental coordination/leveraging
- ☐ City funding

78. Which funding sources should be considered or reevaluated in the future?

APPENDIX B

Needs Assessment Table

Table B-1. City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Public Education and Outreach		
S5.C.1.a – Education and outreach program "To build general awareness, Permittees shall select from the following target audiences and subject areas: (a) General public (including school age children), and businesses (including home-based and mobile businesses): • General impacts of stormwater on surface waters. • Impacts from impervious surfaces. • Impacts of illicit discharges and how to report them. • Low impact development (LID) principles and LID best management practices (BMPs). • Opportunities to become involved in stewardship activities. (b) Engineers, contractors, developers and land use planners • Technical standards for stormwater site and erosion control plans. • LID principles and LID BMPs. • Stormwater treatment and flow control BMPs/facilities."	Based on the 2017 SWMP: • Portable Stormwater Education Kiosk • *Inside Lynnwood* Newsletter • *Stormwater education grants program* • Provide source control BMP information to businesses during license issuance/renewal • Partner with the Environmental Coalition of South Seattle (ECOSS) for business education, assistance, and behavior change • Source control technical assistance: Work with businesses to develop practical methods of reducing or eliminating discharge of non-stormwater materials into the stormwater system • Construction and contractor's meetings: Increase awareness of technical standards for stormwater site and erosion control plans, LID techniques and tools • Participation in STORM (Stormwater Outreach for Regional Municipalities), Natural Yard Care (depending on funding), and the Puget Sound Starts Here efforts Brochures, posters, and resources on the City website under the heading "Stormwater Education": <www.lynnwoodwa.gov/City-Services/Environmental--Surface-Water-and-Storm-Water/Stormwater-Education.htm>. • Pet waste • Car care • Lawn and garden • Feeding waterfowl • Stream markers • Hazardous materials • Septic systems • Car washing Based on information gathering meetings: • Giveaways (trees and pet waste bags) at community events such as the Lynnwood Street Fair. • Car wash kit for charity car washes. • The City is working on educational signage for City-owned facilities.	**Moderate** • Minor website updates: o Change "Stream Markers" to "Storm Drain Markers" • Update Stormwater Education kiosk materials • Reevaluate current education and outreach materials • Social media outreach **Enhanced** • Update Stormwater Education kiosk materials • Develop new education and outreach materials • Expand funding for NatureVision program • Increase the number of public education and outreach programs • Expand social media outreach
S5.C.1.b – Stewardship opportunities "Each Permittee shall create stewardship opportunities and/or partner with existing organizations to encourage residents to participate in activities such as stream teams, storm drain marking, volunteer monitoring, riparian plantings and education activities."	Based on information gathering meetings: • The City has a storm drain marking program with limited opportunities for public participation. • Partner with Snohomish Conservation District to construct rain gardens on private property. • Parks Department hosts community tree planting events.	**Moderate** • Engage residents/students to participate in Hall Lake fish hatchery once it is up and running **Enhanced** • Develop and implement an "Adopt a Stream/Wetland" or similar program • Expand rain garden program
S5.C.1.c – Measure the understanding and adoption of targeted behaviors "Each Permittee shall measure the understanding and adoption of the targeted behaviors for at least one target audience in at least one subject area. No later than February 2, 2016, Permittees shall use the resulting measurements to direct education and outreach resources most effectively, as well as to evaluate changes in adoption of the targeted behaviors. Permittees may meet this requirement individually or as a member of a regional group."	Based on information gathering meetings: • The Natural Yard Care program through led by the WSU Extension in Snohomish County and partnered with local jurisdictions (including Mountlake Terrace and Edmonds) has lost funding.	**Minimum (NPDES Compliant)** Identify or develop a new trackable program to replace Natural Yard Care.

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.		
Permit Section	**Current Activities**	**Recommendations**
Public Involvement and Participation		
S5.C.2.a – Create opportunities public participation "Permittees shall provide ongoing opportunities for public involvement and participation through advisory councils, public hearings, watershed committees, participation in developing rate-structures or other similar activities. Each Permittee shall comply with applicable state and local public notice requirements when developing elements of the SWMP. The minimum performance measures are: a. Permittees shall create opportunities for the public to participate in the decision-making processes involving the development, implementation and update of the Permittee's SWMP." b. See below.	Based on the 2017 SWMP: • The City Council holds public hearings on budgetary expenditures, Surface Water Utility rates, and anytime a study or plan is contemplated for adoption. • Staff created and regularly meet with a citizen's advisory group to provide advice on activities within the Scriber Creek corridor. This is the only group that meets regularly. • Conduct public involvement process for 2018 SWMP (December 2017).	**Moderate** Report out to Parks Advisory Board (citizen panel) **Enhanced** Reactivate and engage Citizen Advisory Group
S5.C.2.b – Post the SWMP Plan and annual report on City's website "b. Each Permittee shall post on their website their SWMP Plan and the annual report required under S9.A no later than May 31 each year. All other submittals shall be available to the public upon request."	Based on the 2017 SWMP: • Posted SWMP and 2016 Annual Report on City website with an invitation to the public to submit comments on the document.	No gaps identified.
Illicit Discharge Detection and Elimination		
S5.C.3.a – Ongoing mapping requirements "a. Mapping of the MS4 shall continue on an ongoing basis. MS4 maps shall be periodically updated. Update maps if necessary to meet the requirements of this section no later than February 2, 2018. At a minimum, maps shall include the following information: i. Known MS4 outfalls and known MS4 discharge points. ii. Receiving waters, other than ground water. iii. Stormwater treatment and flow control BMPs/facilities owned or operated by the Permittee. iv. Tributary conveyances to all known outfalls and discharge points with a 24 inch nominal diameter or larger, or an equivalent cross-sectional area for non-pipe systems. The following attributes shall be mapped: • Tributary conveyance type, material, and size where known. • Associated drainage areas. • Land use.	Based on the 2017 SWMP: • The City maintains maps and an associated GIS database for the municipal separate stormwater system using Cartegraph and ARCMap. • The City has as-builts for historical stormwater facilities. • Maps are available upon request.	**Minimum (NPDES Compliant)** • Map City owned or operated stormwater facilities by 2-2-18 • Map new City owned or operated stormwater facilities on an ongoing basis after 2-2-18 **Future (NPDES Compliant)** • Report outfall attributes to Ecology **Moderate** • Dedicated Asset Management staff to enter and manage stormwater facility and conveyance data • Expand attribute data collected (storage volume, etc.)

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.		
Permit Section	**Current Activities**	**Recommendations**
Illicit Discharge Detection and Elimination (continued)		
v. All connections to the MS4 authorized or allowed by the Permittee after February 16, 2007. vi. Connections between the MS4 owned or operated by the Permittee and other municipalities or public entities. vii. Geographic areas served by the Permittee's MS4 that do not discharge stormwater to surface waters."		
S5.C.3.b – Illicit discharge ordinance "Each Permittee shall implement an ordinance or other regulatory mechanism to effectively prohibit non-stormwater, illicit discharges into the Permittee's MS4 to the maximum extent allowable under state and federal law." "vi. The Permittee's ordinance or other regulatory mechanism in effect as of the effective date of this permit shall be revised if necessary to meet the requirements of this section no later than February 2, 2018."	Based on information gathering meeting: • The City adopted Ordinance 2834 in 2010 that established illicit discharge language in LMC 13.45. • Based on the language included in LMC 13.45, no changes are needed for compliance with the updated language included in the NPDES Phase II permit.	No gaps identified.
S5.C.3.c – Ongoing program implementation to identify and detect illicit discharges "c. Each Permittee shall implement an ongoing program designed to detect and identify non-stormwater discharges and illicit connections into the Permittee's MS4. The program shall include the following components: i. Procedures for conducting investigations of the Permittee's MS4, including field screening and methods for identifying potential sources … All Permittees … shall complete field screening for at least 40% of the MS4 no later than December 31, 2017, and on average 12% each year thereafter."	Based on the 2017 SWMP: • The City developed an IDDE Program Manual in 2011 to guide the IDDE program and response, and is regularly used. • Basic sampling kits, and other equipment are kept on-hand to assist in identifying illicit discharges. Sampling and equipment include: o Surfactant testing equipment o Chlorine and fluoride sampling kits o Turbidimeter o Sterile sample bottles o Pipe cameras Based on 2016 NPDES Annual Report: • Methodology for investigations: City of Lynnwood Illicit Discharge Detection and Elimination Program, prepared by Herrera in 2011. • 17% of MS4 coverage area screened in reporting year. Based on information gathering meetings: • The City has performed outfall inspections and creek walks in the past, but has shifted to a different method of illicit discharge field screening. • The City is on track to meet the 40% screening requirement by 12-31-17.	**Minimum (NPDES Compliant)** • Modify catch basin inspection form to include illicit discharge checkbox **Enhanced** • Review Closed Circuit Television (CCTV) data collected as part of the asset management program for illicit connections
ii. A publicly listed and publicized hotline or other telephone number for public reporting of spills and other illicit discharges.	Based on the 2017 SWMP: • The City has an illicit discharge hotline: 425-670-KRUD. This hotline is publicized in City publications, online, and in utility bills. Records are kept of calls received, and actions taken as a result of these calls. Based on information gathering meetings: • Illicit Discharges are identified mostly by M&O inspections. They are also identified by calls from the public and from construction inspectors.	No gaps identified.

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.		
Permit Section	**Current Activities**	**Recommendations**
Illicit Discharge Detection and Elimination (continued)		
iii. An ongoing training program for all municipal field staff, who, as part of their normal job responsibilities, might come into contact with or otherwise observe an illicit discharge and/or illicit connection to the MS4, on the identification of an illicit discharge and/or connection, and on the proper procedures for reporting and responding to the illicit discharge and/or connection. Follow-up training shall be provided as needed.	Based on information gathering meetings: • The City has trained staff on IDDE in the past, but does not have a formal ongoing training program for IDDE.	**Minimum (NPDES Compliant)** • Develop and implement ongoing IDDE training program for field staff which may include the following: o Require applicable City staff to watch Illicit Connection and Illicit Discharge (IC/ID) Field Screening and Source Tracing Guidance Manual videos: <www.wastormwatercenter.org/illicit-connection-illicit-discharge>. o Attend in-person IC/ID field screening training (if offered) in late 2018 **Moderate** • Develop a more formal IDDE training program for Fire Department and Building Inspectors **Enhanced** • Develop enhanced internal IDDE training program
iv. Permittees shall inform public employees, businesses, and the general public of hazards associated with illicit discharges and improper disposal of waste."	Based on information gathering meetings: • Information sharing actions: City website, ECOSS, Public Involvement and Outreach opportunities	No gaps identified.
S5.C.3.d – Ongoing program implementation to address illicit discharges "d. Each Permittee shall implement an ongoing program designed to address illicit discharges, including spills and illicit connections, into the Permittee's MS4. The program shall include: i. Procedures for characterizing the nature of, and potential public or environmental threat posed by, any illicit discharges found by or reported to the Permittee. Procedures shall address the evaluation of whether the discharge must be immediately contained and steps to be taken for containment of the discharge. ii. Procedures for tracing the source of an illicit discharge; including visual inspections, and when necessary, opening manholes, using mobile cameras, collecting and analyzing water samples, and/or other detailed inspection procedures. iii. Procedures for eliminating the discharge; including notification of appropriate authorities; notification of the property owner; technical assistance; follow-up inspections; and use of the compliance strategy developed pursuant to S5.C.3.b.v, including escalating enforcement and legal actions if the discharge is not eliminated.	Based on information gathering meetings: • Water quality complaints and reports of spills or dumping are investigated on average within 1 working day of receipt (usually within the same hour if during regular business hours). • Spills are tracked for Ecology reporting. • Community Transit is good at self-reporting, which the City must track. • Construction sites are required to have a Spill Prevention Control and Countermeasure (SPCC) plan and to report to the City. • Sewage breaks and surcharging are typically reported to Ecology. • The City has developed a general tracking form for IDDE. • Action is regularly taken against citizens who are summoned to court and must pay a fine. Usually, citizens are first issued a citation and that complaints are resolved without going to court.	No gaps identified.

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Illicit Discharge Detection and Elimination (continued)		
iv. Compliance with the provisions in (i), (ii), and (iii), above, shall be achieved by meeting the following timelines: • Immediately respond to all illicit discharges, including spills, which are determined to constitute a threat to human health, welfare, or the environment, consistent with General Condition G3. • Investigate (or refer to the appropriate agency with the authority to act) within 7 days, on average, any complaints, reports or monitoring information that indicates a potential illicit discharge. • Initiate an investigation within 21 days of any report or discovery of a suspected illicit connection to determine the source of the connection, the nature and volume of discharge through the connection, and the party responsible for the connection. • Upon confirmation of an illicit connection, use the compliance strategy in a documented effort to eliminate the illicit connection within 6 months. All known illicit connections to the MS4 shall be eliminated."		
S5.C.3.e – Ongoing staff training program for IDDE "e. Permittees shall train staff who are responsible for identification, investigation, termination, cleanup, and reporting of illicit discharges, including spills, and illicit connections, to conduct these activities. Follow-up training shall be provided as needed to address changes in procedures, techniques, requirements or staffing. Permittees shall document and maintain records of the training provided and the staff trained."	Based on the 2017 SWMP: • Surface Water staff regularly train, or send to off-site training, all field employees on illicit discharge identification and follow-up procedures.	**Minimum (NPDES Compliant)** • Develop and implement ongoing training program for field staff (IDDE) which may include the following: o Require applicable City staff to watch Illicit Connection and Illicit Discharge (IC/ID) Field Screening and Source Tracing Guidance Manual videos: <www.wastormwatercenter.org/illicit-connection-illicit-discharge>. o Attend in-person IC/ID field screening training (if offered) in late 2018 **Enhanced** • Develop enhanced internal training program
S5.C.3.f – Track and maintain records "f. Recordkeeping: Permittees shall track and maintain records of the activities conducted to meet the requirements of this section."	Based on the 2017 SWMP: • Continue enforcement strategy and documenting enforcement actions taken Based on the kickoff meeting with City Staff: • Daily inspection records are kept in Cartegraph; however, the information is limited to "Cleaned?" Yes/No and "Repaired?" Yes/No.	**Moderate** • Track IDDE issues through work orders and asset management.

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Controlling Runoff from New Development, Redevelopment, and Construction Sites		
S5.C.4.a – Ordinance to address runoff from development, redevelopment, and construction sites "a. Implement an ordinance or other enforceable mechanism that addresses runoff from new development, redevelopment, and construction site projects … The ordinance or other enforceable mechanism shall include, at a minimum: i. The Minimum Requirements, thresholds, and definitions in Appendix 1 or a program approved by Ecology under the 2013 NPDES Phase I Municipal Stormwater Permit, for new development, redevelopment, and construction sites … ii. The local requirements shall include the following requirements, limitations, and criteria that, when used to implement the minimum requirements in Appendix 1 (or program approved by Ecology under the 2013 Phase I Permit) … iii. The legal authority, through the approval process for new development and redevelopment, to inspect and enforce maintenance standards for private stormwater facilities approved under the provisions of this section that discharge to the Permittee's MS4."	Based on the 2017 SWMP: • Lynnwood Municipal Code (LMC) 13.40 addresses development standards for development, redevelopment and construction sites and includes a permit review and approval process, design standards, erosion control requirements, maintenance standards, inspection and maintenance of post-construction permanent stormwater controls, and enforcement provisions.	No gaps identified.
S5.C.4.b – Permitting process with site plan review, inspection, and enforcement "b. The program shall include a permitting process with site plan review, inspection and enforcement capability to meet the standards listed in (i) through (iv) below, for both private and public projects, using qualified personnel (as defined in Definitions and Acronyms). At a minimum, this program shall be applied to all sites that meet the minimum thresholds adopted pursuant to S5.C.4.a.i, above. i. Review of all stormwater site plans for proposed development activities. ii. Inspect, prior to clearing and construction, all permitted development sites that have a high potential for sediment transport as determined through plan review based on definitions and requirements in Appendix 7 Determining Construction Site Sediment Damage Potential …	Based on the 2017 SWMP: • The City reviews all public and private projects with land disturbance, regardless of size. • The City requires submittal and approval of SWPPPs and SPCCs prior to beginning construction activities. • The City maintains records of reviews by staff. Based on kickoff meeting with City Staff: • The City's inspector checks for SWPPP and erosion control plans. Based on information gathering meetings: • The City is working on developing a checklist for when a SWPPP with the full 13 elements is needed. Based on 2016 NPDES Annual Report: • 66 site plans reviewed during reporting period • 18 construction sites inspected prior to clearing during reporting period	**Minimum (NPDES Compliant)** • Document site plan review process (public and private) • Update and develop new stormwater plan review checklist(s) **Moderate** • Develop a simplified construction SWPPP template for small projects • Develop guidelines for feasibility and site testing • Provide LID technical assistance at the permit counter • Provide links to other resources on the City website • Become more involved with project design and ramp-up to find opportunities for partnerships (retrofits, LID pilot projects, demonstration projects) for public projects • Develop criteria for contribution of stormwater funds for public projects **Enhanced** • Develop LID Infeasibility Map for the City • Expand the LID toolkit (resource list, modeling software training, and videos)

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Controlling Runoff from New Development, Redevelopment, and Construction Sites (continued)		
iii. Inspect all permitted development sites during construction to verify proper installation and maintenance of required erosion and sediment controls. Enforce as necessary based on the inspection. iv. Inspect all permitted development sites upon completion of construction and prior to final approval or occupancy to ensure proper installation of permanent stormwater facilities. Verify that a maintenance plan is completed and responsibility for maintenance is assigned for stormwater treatment and flow control BMPs/facilities. Enforce as necessary based on the inspection. v. Compliance with the inspection requirements in (ii), (iii) and (iv) above, shall be determined by the presence and records of an established inspection program designed to inspect all sites. Compliance during this permit term shall be determined by achieving at least 80% of scheduled inspections. vi. An enforcement strategy shall be implemented to respond to issues of non-compliance."	Based on the 2017 SWMP: • The City inspects all public and private projects with land disturbance, regardless of size. • For projects greater than 1 acre in size, the City has adopted and enforces the same standards as Ecology (in the General Construction NDPES Permit). • The City maintains records of inspection and enforcement actions by staff. Based on 2016 NPDES Annual Report: • 125 construction sites inspected during construction during reporting period • 2 enforcement actions taken Based on information gathering meetings: • Development Review Inspectors perform private construction site inspections. • Consultants or City staff conduct construction site inspections for public (CIP) projects. • The typical response to erosion control violations found during inspections is as follows: o First, the inspector gives a notice of violation. o When the notice of violation is not enough, a stop work orders is issued.	**Moderate** • Modify/update construction site inspection checklists. • Electronic inspection tracking. • Streamline process for issuing a citation (including staff roles and responsibilities). • Revise code to enact administrative penalties. • Require consultants conducting construction site inspections for public (CIP) projects to have Certified Erosion and Sediment Control Lead (CESCL) training.
S5.C.4.c – Long term operations and maintenance of stormwater treatment and flow control BMPs/ facilities "c. The program shall include provisions to verify adequate long-term operation and maintenance (O&M) of stormwater treatment and flow control BMPs/facilities … i. Implementation of an ordinance or other enforceable mechanism that clearly identifies the party responsible for maintenance, requires inspection of facilities in accordance with the requirements in (ii) through (iv) below, and establishes enforcement procedures. ii. Each Permittee shall establish maintenance standards that are as protective or more protective of facility function than those specified in Chapter 4 of Volume V of the Stormwater Management Manual for Western Washington. For facilities which do not have maintenance standards, the Permittee shall develop a maintenance standard.	Based on the 2017 SWMP: • The City regularly inspects, keeps records of, and requires maintenance (when necessary) for private stormwater facilities. • The City has a spreadsheet database of know private stormwater facilities. • The City maintains records of inspection and enforcement actions by staff.	**Minimum (NPDES Compliant)** • Map known private stormwater facilities • Map new private stormwater facilities designed to meet MR#6 or MR#7 on an ongoing basis **Moderate** • Develop education and outreach materials to distribute during inspections • Expand attribute data collected (storage volume, etc.) • Streamline process for issuing a citation (including staff roles and responsibilities) • Revise code to enact administrative penalties **Enhanced** • Include historical facilities (pre-2010) in inspection program • Develop Homeowners Association (HOA) contact procedure

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Controlling Runoff from New Development, Redevelopment, and Construction Sites (continued)		
iii. Annual inspections of all stormwater treatment and flow control BMPs/facilities that discharge to the MS4 and were permitted by the Permittee according to S5.C.4.b … iv. Inspections of all permanent stormwater treatment and flow control BMPs/facilities and catch basins in new residential developments every six months until 90% of the lots are constructed … v. … Compliance during this permit term shall be determined by achieving at least 80% of scheduled inspections. vi. Unless there are circumstances beyond the Permittee's control, when an inspection identifies an exceedance of the maintenance standard, maintenance shall be performed: • Within 1 year for typical maintenance of facilities, except catch basins. • Within 6 months for catch basins. • Within 2 years for maintenance that requires capital construction of less than $25,000. vii. The program shall include a procedure for keeping records of inspections and enforcement actions by staff, including inspection reports, warning letters, notices of violations, and other enforcement records …"		
S5.C.4.d – Notice of Intent copies "d. The program shall make available as applicable copies of the "Notice of Intent for Construction Activity" and copies of the "Notice of Intent for Industrial Activity" to representatives of proposed new development and redevelopment. Permittees shall continue to enforce local ordinances controlling runoff from sites that are also covered by stormwater permits issued by Ecology."	Based on the 2017 SWMP: • The City provides copies of the Notice of Intent for Construction Activities and the Notice of Intent for Industrial Activities to representatives of proposal new development and redevelopment.	No gaps identified.

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Controlling Runoff from New Development, Redevelopment, and Construction Sites (continued)		
S5.C.4.e – Ongoing staff training program to control stormwater runoff "e. Each Permittee shall ensure that all staff whose primary job duties are implementing the program to control stormwater runoff from new development, redevelopment, and construction sites, including permitting, plan review, construction site inspections, and enforcement, are trained to conduct these activities. Follow-up training shall be provided as needed to address changes in procedures, techniques or staffing. Permittees shall document and maintain records of the training provided and the staff trained."	Based on the 2017 SWMP: • All of the City's inspectors and reviewers are CESCL certified. The Surface Water Division has a dedicated erosion control inspector for construction sites, and all Surface Water Division staff, and Engineering Development Review staff are CESCL certified.	**Minimum (NPDES Compliant)** • Develop and implement ongoing training program for plan reviewers, construction site inspectors, and private stormwater facility maintenance inspectors **Enhanced** • Develop an enhanced internal training program
S5.C.4.f – LID code related requirements "f. Low impact development code-related requirements. i. No later than December 31, 2016, Permittees shall review, revise and make effective their local development-related codes, rules, standards, or other enforceable documents to incorporate and require LID principles and LID BMPs … ii. … The summary shall include existing requirements for LID principles and LID BMPs in development-related codes. The summary shall be organized as follows: (a) Measures to minimize impervious surfaces; (b) Measures to minimize loss of native vegetation; and (c) Other measures to minimize stormwater runoff."	Based on the 2016 NPDES Annual Report: Implemented the following revisions/updates: • Amended City of Lynnwood Comprehensive Plan – Nov. 28, 2016 • Amended LMC 9.06 (Fire Lanes) – Ordinance 3196 on July 1, 2016 • Amended LMC 19.35 (Subdivision Design Standards) – Ordinance 3192 on May 17, 2016 • Amended LMC 21.60 (City Center Design Standards) – Ordinance 3192 on May 17, 2016 • Amended LMC 17.10 (Critical Areas Regulations) – Ordinance 3193 on May 23, 2016 • Amended LMC 21.57 (College District Mixed Use Zone) – Ordinance 3216 on Sept. 26, 2016 • Amended LMC 21.30 (Planned Unit Development) – Ordinance 3243 on Jan. 17, 2017 • Developed Supplemental Stormwater Guidelines • Updated Lynnwood Standard Plans Reviewed the following, but no changes/actions taken: • LMC 13.40 (Stormwater Management) • LMC 17.15 (Tree Regulations) • LMC 21.42 (Single Family Residential Zones) • LMC 21.43 (Residential Multi-Family Zone) • LMC 21.62 (Highway 99 Mixed Use Zones) • City Center Design Guidelines • Design Guidelines for Highway 99 Mixed Use Zones • Transition Area Design Guidelines • Tree Preservation and Protection Guidelines • Sidewalks, Planting Strips, and Transition Strips	No gaps identified.
S5.C.4.g – Watershed-scale stormwater planning	City is not currently a participant.	**Minimum (NPDES Compliant)** • Not applicable to the City because it is not located in any of the proposed Phase I basins. **Future (NPDES Compliant)** • Priority watershed plan development

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Municipal Operations and Maintenance		
S5.C.5.a – Implement SWMMWW O&M standards or equivalent "a. Each Permittee shall implement maintenance standards that are as protective, or more protective, of facility function than those specified in Chapter 4 of Volume V of the Stormwater Management Manual for Western Washington …"	Based on the 2017 SWMP: • The City adopted a Surface Water Management Comprehensive Plan in August 2009, and is in the process of updating this plan. • In 2014, Public Works adopted, and currently implements an Integrated Pest Management Plan (IPMP). • Continue to implement the maintenance standards as noted in the both the Stormwater Management Manual for Western Washington, and the City's Surface Water Management Comprehensive Plan.	No gaps identified.
S5.C.5.b – Annual inspection of stormwater treatment and flow control facilities/BMPs "b. Annual inspection of all municipally owned or operated permanent stormwater treatment and flow control BMPs/facilities, and taking appropriate maintenance actions in accordance with the adopted maintenance standards."	Based on 2016 NPDES Annual Report: • 124 municipally owned facilities, all of them inspected, 14 required maintenance during the reporting period. Based on information gathering meeting: • Variable inspection frequency of City stormwater facilities: o Ponds: approximately 3 times per year o Detention tanks/vaults/pipes: every 2 years o Media filter vaults: 2 year schedule o Oil/water separator: every 3 years o Filterra: annually o Permeable pavement: monthly or every 2–3 weeks o Rain gardens: TBD • Variable maintenance frequency of City stormwater facilities: o Ponds: mowing (every 3–4 weeks, less frequently in summer), debris removal, etc. o Detention tanks/vaults/pipes: every 2 years o Media filter vaults: replace canisters every 3 to 5 years o Oil/water separator: every 3 years o Filterra: replace mulch and replant as needed o Permeable pavement: blowing off grass clippings monthly or every 2–3 weeks o Rain gardens: frequent weeding	**Minimum (NPDES Compliant)** • Increase inspection frequency of all City-owned stormwater facilities to annual (at a minimum) • Develop M&O manuals for City-owned stormwater facilities **Moderate** • Seasonal vegetation maintenance for bioretention facilities and rain gardens **Enhanced** • Purchase additional equipment for maintaining permeable pavement
S5.C.5.c – Spot checks of potentially damaged stormwater treatment and flow control facilities/ BMPs "c. Spot checks of potentially damaged permanent stormwater treatment and flow control BMPs/facilities after major storm events (24 hour storm event with a 10 year or greater recurrence interval)."	Based on information gathering meeting: • Crews perform spot checks prior to and after major storm events (clearing woody debris from trash racks, catch basins, culverts).	No gaps identified.
S5.C.5.d – Inspection of catch basins and inlets "d. … inspection of all catch basins and inlets owned or operated by the Permittee at least once no later than August 1, 2017 and every two years thereafter …"	Based on the 2017 SWMP: • All catch-basins and inlets are inspected and cleaned at a minimum of every 3 years (beginning in 1995), many are done annually. Based on 2016 NPDES Annual Report: • No alternative catch basin cleaning approach. • 2,015 catch basins and inlets inspected and cleaned inspected during the reporting period.	**Minimum (NPDES Compliant)** • Implement a 2-year catch basin and inlet inspection cycle after 8-1-17 **Moderate** • Optimize catch basin and inlet inspection schedule

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Municipal Operations and Maintenance (continued)		
S5.C.5.e – Inspection program "e. Compliance with the inspection requirements in b, c, and d above shall be determined by the presence of an established inspection program designed to inspect all sites and achieving at least 95% of inspections."	Refer to previous row.	Refer to previous row
S5.C.5.f – Practices, policies, and procedures to reduce stormwater impacts "f. Implement practices, policies and procedures to reduce stormwater impacts associated with runoff from all lands owned or maintained by the Permittee, and road maintenance activities under the functional control of the Permittee … The following activities shall be addressed: • Pipe cleaning • Cleaning of culverts that convey stormwater in ditch systems • Ditch maintenance • Street cleaning • Road repair and resurfacing, including pavement grinding • Snow and ice control • Utility installation • Pavement striping maintenance • Maintaining roadside areas, including vegetation management • Dust control • Application of fertilizers, pesticides, and herbicides according to the instructions for their use, including reducing nutrients and pesticides using alternatives that minimize environmental impacts • Sediment and erosion control • Landscape maintenance and vegetation disposal • Trash and pet waste management • Building exterior cleaning and maintenance"	Based on the 2017 SWMP: • Ongoing evaluation and revision of maintenance practices associated with municipally owned or operated streets, parking lots, and roads. • Ongoing evaluation and revision of operation and maintenance practices for municipally-owned lands in order to reduce pollutants in runoff.	**Minimum (NPDES Compliant)** • Develop Standard Operating Procedures (SOPs) for City activities based on Seattle Department of Transportation and City of Bellevue SOPs. **Future (NPDES Compliant)** • Update SOPs if permit changes occur. **Moderate** • Review and update SOPs every 5 years.

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Municipal Operations and Maintenance (continued)		
S5.C.5.g – Ongoing training program to protect water quality "g. Implement an ongoing training program for employees of the Permittee whose primary construction, operations or maintenance job functions may impact stormwater quality. The training program shall address the importance of protecting water quality, operation and maintenance standards, inspection procedures, selecting appropriate BMPs, ways to perform their job activities to prevent or minimize impacts to water quality, and procedures for reporting water quality concerns. Follow-up training shall be provided as needed to address changes in procedures, techniques, requirements, or staffing. Permittees shall document and maintain records of training provided and the staff trained."	Based on the 2017 SWMP: • All M&O staff (in all utility departments, including Parks and Recreation) have attended training associated with pollutant reduction, and include annual refresher training. Based on information gathering meetings: • Informal on-the-job training	**Minimum (NPDES compliant)** • Ongoing training program to select appropriate BMPs, prevent or minimize water quality impacts, and reporting procedures **Moderate** • Ongoing program for LID facility inspections and maintenance
S5.C.5.h – SWPPP implementation "h. Implement a Stormwater Pollution Prevention Plan (SWPPP) for all heavy equipment maintenance or storage yards, and material storage facilities owned or operated by the Permittee in areas subject to this Permit …"	Based on the 2017 SWMP: • The City developed a SWPPP for the UMC and the WWTP, adopted in June 2009.	**Minimum (NPDES compliant)** • Update SWPPP • Conduct wet and dry weather inspections • Update spill history record **Moderate** • Review and update SWPPP if operations or storage at the facility changes, or if significant staffing changes occur
S5.C.5.i – Maintain records of inspections and maintenance "i. Maintain records of inspections and maintenance or repair activities conducted by the Permittee."	Review to Reporting section below.	Refer to Reporting section below.
Compliance with Total Maximum Daily Load (TMDL) Requirements		
S7.A – Compliance with TMDL Requirements "For applicable TMDLs listed in Appendix 2, affected Permittees shall comply with the specific requirements identified in Appendix 2. Each Permittee shall keep records of all actions required by this Permit that are relevant to applicable TMDLs within their jurisdiction. The status of the TMDL implementation shall be included as part of the annual report submitted to Ecology. Each annual report shall include a summary of relevant SWMP and Appendix 2 activities conducted in the TMDL area to address the applicable TMDL parameter(s)."	Based on information gathering meetings: • Compliance with Swamp Creek TMDL	No gaps identified.

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Monitoring and Assessment		
S8.A – Monitoring and Assessment "All Permittees including Secondary Permittees shall provide, in each annual report, a description of any stormwater monitoring or stormwater-related studies conducted by the Permittee during the reporting period. If other stormwater monitoring or stormwater-related studies were conducted on behalf of the Permittee during the reporting period, or if stormwater-related investigations conducted by other entities were reported to the Permittee during the reporting period, a brief description of the type of information gathered or received shall be included in the annual report."	Scriber Lake Water Quality Monitoring (February through December 2016).	No gaps identified.
S8.B, S8.C, and S8.D – Regional Stormwater Monitoring Program B. Status and trends monitoring C. Stormwater management program effectiveness studies D. Source identification and diagnostic monitoring	The City participates in all three options in the Regional Stormwater Monitoring Program: • Status and trends = $8,829 annual payment • Effectiveness studies = $14,711 annual payment • Source identification and diagnostic monitoring = $1,364 annual payment	No gaps identified.
Reporting		
S9.A – Annual Report "A. No later than March 31 of each year beginning in 2015, each Permittee shall submit an annual report. The reporting period for the first annual report will be from January 1, 2014 through December 31, 2014. The reporting period for all subsequent annual reports will be the previous calendar year unless otherwise specified."	The City submits Annual Reports to Ecology through Ecology's Water Quality Permitting Portal (WQWebPortal).	No gaps identified.
S9.B – Record Retention "Each Permittee is required to keep all records related to this permit and the SWMP for at least five years."	Based on information gathering meetings: • Paper forms and manual data entry	**Moderate** • Tablets and software for data collection in the field, No paper forms or manual data entry • Hire dedicated staff member to support project closeout procedures and implement consistent nomenclature/project naming **Enhanced** • Develop recordkeeping guidelines and requirements • Quality Assurance/Quality Control (QA/QC) procedures/checks

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.		
Permit Section	**Current Activities**	**Recommendations**
Asset Management		
Not applicable (not currently a NPDES Phase II permit requirement)	Not applicable.	**Moderate** Collect data • Define asset inventory attributes • Integrate software and database forms for evaluation and tracking • Prioritize and schedule inspections • Hire a contractor/set up a small works contract to collect field data (measurements and CCTV) • Develop database of asset characteristics **Enhanced** Analyze/manage data • Prioritize maintenance and CIPs based on asset inventory attributes • Add replacement/repair projects to the City's Surface Water CIP list
Source Control Program for Existing Development		
S5.C.X (new section) – Source Control Ordinance Preliminary draft language in the 2019–2023 NPDES Phase II permit states: "No later than August 1, 2021, Permittees shall adopt and begin enforcement of an ordinance(s), or other enforceable documents, requiring the application of source control BMPs for pollutant generating sources associated with existing land uses and activities." "No later than January 1, 2022, each Permittee shall implement a progressive enforcement policy to require sites to come into compliance with stormwater requirements within a reasonable time period."	Not applicable.	**Future (NPDES Compliant)** • Develop ordinance and enforcement policy
S5.C.X (new section) – Source Control Inventory Preliminary draft language in the 2019–2023 NPDES Phase II permit states: "No later than August 1, 2021, the Permittees shall establish an inventory that identifies publicly and privately owned commercial, and industrial properties which have the potential to generate pollutants to the Permittee's MS4."	Not applicable.	**Future (NPDES Compliant)** • Develop source control inventory

Table B-1 (continued). City of Lynnwood Stormwater Management Program Needs Assessment Table.

Permit Section	Current Activities	Recommendations
Source Control Program for Existing Development (continued)		
S5.C.X (new section) – Source Control Inspection Program Preliminary draft language in the 2019–2023 NPDES Phase II permit states: "No later than January 1, 2022, Permittees shall implement an inspection program … The Permittee shall annually complete the number of inspections equal to 20% of the businesses and/or properties listed in their source control inventory to assure BMP effectiveness and compliance with source control requirements. The Permittee may count follow-up compliance inspections at the same site toward the 20% inspection rate. The Permittee may select which sites to inspect each year and is not required to inspect 100% of sites over a 5-year period. Sites may be prioritized for inspection based on their land use category, potential for pollution generation, proximity to receiving waters, or to address an identified pollution problem within a specific geographic area or sub-basin."	Not applicable.	**Future (NPDES Compliant)** • Implement business inspection program
S5.C.X (new section) – Source Control Training Program Preliminary draft language in the 2019–2023 NPDES Phase II permit states: "Permittees shall train staff who are responsible for implementing the source control program to conduct these activities. The ongoing training program shall cover the legal authority for source control, source control BMPs and their proper application, inspection protocols, lessons learned, typical cases, and enforcement procedures. Follow-up training must be provided as needed to address changes in procedures, techniques, requirements, or staff. Permittees shall document and maintain records of the training provided and the staff trained."	Not applicable.	**Future (NPDES Compliant)** • Develop and implement ongoing training program

APPENDIX C

M&O Levels of Service Meeting Notes

M&O Service Level Discussion Table: Meeting Updates

Topic	Existing	Minimum (NPDES Compliant)	Moderate	Enhanced
Inspections	Variable frequency of inspection of City stormwater facilities: • **Permeable pavement:** Monthly or every 2 to 3 weeks • **Ponds:** Approximately 3 times per year • **Filterra:** Annually • **Detention tanks/vaults/pipes:** Every 2 years • **Media filter vaults:** Every 2 years • **Oil/water separator:** Every 3 years • **Rain gardens:** TBD	Annual inspections of City stormwater facilities. *(A written statement based on actual inspection and maintenance experiences that is certified in accordance with Section G.19 of the permit can be submitted to justify an inspection schedule other than annual.)*	Same as Minimum (NPDES Compliant).	Same as Minimum (NPDES Compliant).
Spot Checks	Visiting stormwater facilities prior to and after major storm events (clearing woody debris from trash racks, CBs, culverts).	Visiting stormwater facilities prior to and after major storm events.	Same as Minimum (NPDES Compliant).	Same as Minimum (NPDES Compliant).
Catch Basins	Inspections and cleaning (3-year cycle).	Inspect at least once by 8-1-17 and 2-year inspection cycle after 8-1-17.	Optimize inspection schedule. *(Can adjust 2-year inspection schedule if maintenance records of double the length of time of the proposed inspection frequency supports the reduced frequency.)*	Same as Moderate.

Topic	Existing	Minimum (NPDES Compliant)	Moderate	Enhanced
Street Sweeping	Sweep all City streets (approximately once per month to once every 45 days).	Same as Existing.	Same as Existing.	Same as Existing.
Mapping	Cartegraph location information, spreadsheet database, and as-builts for historical stormwater facilities. *(Need to verify list of recently constructed facilities in Cartegraph and spreadsheet database.)*	Map City owned or operated stormwater facilities by 2-2-18; continue to map new City owned or operated stormwater facilities on an ongoing basis after 2-2-18 (0.5 FTE).	Dedicated Asset Management staff to enter and manage stormwater facility and conveyance data (1 FTE).	Same as Moderate.
Training	Informal on-the-job training.	Ongoing training program to select appropriate BMPs, prevent or minimize water quality impacts, and reporting procedures.	Ongoing program for LID facility inspections and maintenance.	Same as Moderate.

Topic	Existing	Minimum (NPDES Compliant)	Moderate	Enhanced
Stormwater Facility Maintenance	• **Permeable pavement:** Blowing off grass clippings monthly or every 2 to 3 weeks • **Rain gardens:** Frequent weeding • **Ponds:** Mowing (every 3 to 4 weeks, less frequently in summer), debris removal, etc. • **Detention tanks/vaults/pipes:** Every 2 years • **Oil/water separator:** Every 3 years • **Media filter vaults:** Replace canisters every 3 to 5 years • **Filterra:** Replace mulch and replant as needed	Maintain per SWMMWW standards and NPDES permit timelines. Develop M&O manuals for City-owned stormwater facilities.	Seasonal vegetation maintenance for bioretention facilities.	Purchase additional equipment for maintaining permeable pavement.
Municipal SWPPP	City SWPPP developed for the UMC and the WWTP.	Update SWPPP. Conduct wet and dry weather inspections. Update spill history record.	Review and update SWPPP if operations or storage at the facility changes, or if significant staffing changes occur.	Same as Moderate.
Practices, Policies, and Procedures	Integrated Pest Management Plan (IPMP) developed in 2012 for Public Works. Parks has their own IPMP.	Develop Standard Operating Procedures (SOPs) for City activities based on SDOT and Bellevue documents. Update SOPs if permit changes occur.	Review and update SOPs every 5 years.	Same as Moderate.

Topic	Existing	Minimum (NPDES Compliant)	Moderate	Enhanced
Recordkeeping	Paper forms and manual data entry.	Keep records for up to 5 years, but no recommendations on paper vs. electronic.	Tablets and software for data collection in the field. No paper forms or manual data entry.	Same as Moderate.
Asset Management	None.	None.	**Collect data** • Define asset inventory attributes • Integrate software and database forms for evaluation & tracking • Prioritize and schedule inspections • Hire a contractor/set up a small works contract to collect field data (measurements and CCTV) • Develop database of asset characteristics	**Analyze/manage data** 1. Prioritize maintenance and CIPs based on asset inventory attributes (0.5 FTE) 2. Add replacement/ repair projects to City's Surface Water CIP list

APPENDIX D

Surface Water Management Program Levels of Service Meeting Notes

Surface Water Program Management/Engineering Level of Service Table

Topic	Existing	Minimum (NPDES Compliant)	Future (NPDES Compliant)	Moderate	Enhanced
Public Education and Outreach	• Portable Stormwater Education Kiosk • Giveaways (trees and pet waste bags) at community events such as the Lynnwood Street Fair • Car wash kit for charity car washes • Inside Lynnwood Newsletter • Nature Vision program (grants for local school programs) • Provide source control BMP information to businesses during license issuance/renewal • Partner with ECOSS for business source control including education, assistance, and behavior change • Puget Sound Starts Here materials/message	Identify or develop a new trackable program to replace Natural Yard Care	Same as Minimum	• Update kiosk materials • Reevaluate current education and outreach materials • Social media outreach	• Update kiosk materials • Develop new education and outreach materials • Expand funding for Nature Vision program • Increase the number of public education and outreach programs • Expand social media outreach
Stewardship Opportunities	• Storm drain marking (limited opportunities) • Partner with Snohomish Conservation District to construct rain gardens on private property • Tree planting events	Same as Existing	Same as Minimum	Engage residents/students to participate in Hall Lake fish hatchery once it is up and running	• Develop and implement an Adopt a Stream/Wetland or similar program • Expand rain garden program
Public Involvement and Participation	• Post the SWMP and Annual Report on the City's website • Invite public to submit comments on the SWMP • Citizens advisory group for the Scriber Creek corridor	Same as Existing	Same as Minimum	Report out to Parks Advisory Board (citizen panel)	Reactivate and engage Citizen Advisory Group
Illicit Discharge Detection and Elimination	• Illicit discharge hotline (425-670-KRUD) • Investigate water quality complaints and reports of spills or dumping on average within 1 working day • Track illicit discharges and follow-up in an Excel spreadsheet • Illicit discharge ordinance • Illicit discharge field screening (17% completed in 2006, on track for 40% of City by 12-31-17)	Modify CB inspection form to include illicit discharge checkbox	Same as Minimum	• Develop a more formal training program for Fire Department and Building Inspectors • Track IDDE issues through work orders and asset management	Review CCTV data collected as part of the asset management program for illicit connections
Mapping of Public Stormwater Facilities	Primarily covered in the M&O Level of Service table • Develop signage for City-owned facilities	Same as Existing	Report outfall attributes to Ecology	Expand attribute data collected (storage volume, etc.)	Same as Moderate

Topic	Existing	Minimum (NPDES Compliant)	Future (NPDES Compliant)	Moderate	Enhanced
Mapping of Private Stormwater Facilities	• Spreadsheet database • Cartegraph location information (minimal) • As-builts cataloged	• Map known private stormwater facilities • Continue to map new private stormwater facilities designed to meet MR#6 and/or MR#7 on an ongoing basis	Same as Minimum	Expand attribute data collected (storage volume, etc.)	Same as Moderate
Private Stormwater Site Plan Review	• Arnold reviews private stormwater site plans • Jared assists Arnold when requested • Darlene reviews private construction SWPPPs • Applicants use Construction Stormwater Pollution Prevention Plan (CSWPPP) template (not simplified) • Reviewers have a checklist for the 13 elements of a CSWPPP	• Document site plan review process • Update and develop new stormwater plan review checklist(s)	Same as Minimum	• Develop a simplified CSWPPP template for small projects • Develop guidelines for feasibility and site testing • Provide LID technical assistance at the permit counter • Provide links to other resources on City website	• Develop LID Infeasibility Map for the City • Expand the LID toolkit (resource list, modeling software training, and videos)
Public (CIP) Stormwater Site Plan Review	• Jared reviews public (CIP) stormwater site plans • Darlene reviews public construction SWPPPs • Reviewers use a bid ready checklist (which requires signatures from reviewers)	Document site plan review process	Same as Minimum	• Become more involved with project design and ramp-up to find opportunities for partnerships (retrofits, LID pilot projects, demonstration projects) • Develop criteria for contribution of stormwater funds	Same as Moderate
Construction Site Inspections	• Development Review Inspectors perform private construction site inspections • Darlene conducts public and private ESC inspections • Consultants or City staff conduct construction site inspections for public (CIP) projects	Same as Existing	Same as Minimum	• Modify/update construction site inspection checklists • Electronic inspection tracking	Same as Moderate
Private Stormwater Facility Inspections	• Darlene conducts annual inspections of private stormwater facilities designed to meet MR#6 and/or MR#7	• Develop/update database • Develop an inspection schedule • Complete inspections • Complete recordkeeping/tracking	Same as Minimum	Develop education and outreach materials to distribute during inspections	• Include historical facilities (pre-2010) in inspection program • Develop HOA contact procedure
Private Facilities Enforcement	Enforcement process can include: • Recovering cost of abatement • Cease and desist or stop work order • Escalating enforcement	Same as Existing	Same as Minimum	• Streamline process for issuing a citation (including staff roles and responsibilities) • Revise code to enact administrative penalties	Same as Moderate
Training	• Minimal training • All City inspectors have CESCL training	Develop and implement ongoing training program for field staff (IDDE), plan reviewers, construction site inspectors, and private stormwater facility maintenance inspectors	Same as Minimum	• Provide additional training (beyond IDDE) for field staff • Require consultants conducting construction site inspections for public (CIP) projects to have CESCL training	Develop an enhanced internal training program

Topic	Existing	Minimum (NPDES Compliant)	Future (NPDES Compliant)	Moderate	Enhanced
TMDL Requirements	TMDL compliance for Swamp Creek	Same as Existing	Same as Minimum	Same as Existing	Same as Existing
Recordkeeping	Paper forms and manual data entry	Keep records for up to 5 years, but no recommendations on paper vs. electronic	Same as Minimum	• Tablets and software for data collection in the field. No paper forms or manual data entry. • Hire dedicated staff member to support project closeout procedures and implement consistent nomenclature/project naming.	• Develop recordkeeping guidelines and requirements • QA/QC procedures/checks
Business Inspection Source Control Program	Not applicable	Not applicable	• Develop source control inventory • Develop ordinance and enforcement policy • Develop and implement ongoing training program • Implement business inspection program	Same as Minimum	Same as Future (NPDES Compliant)
Watershed Planning	Scriber Creek Corridor Management Plan	Not applicable	Priority watershed plan development	Same as Minimum	Same as Future (NPDES Compliant)

APPENDIX E

Surface Water Management Program Staffing and Funding Tables

Table 2. Recommended Activities for Public Education and Outreach.		Funding						Staff (FTE)					
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum		**Minimum**						**Minimum**					
New trackable program	Identify or develop a new trackable program to replace Natural Yard Care. Assumes development of a new trackable program, 200 consultant hours at $100 per hour and 30 percent staff hours for project management. Staff that currently manage Natural Yard Care will take on the new program.	$ 20,000						0.03					
Evaluate behavior change	Conduct new evaluation of a behavior change program. Assumes 100 consultant hours at $100 per hour and 30 percent staff hours for project management. (July 2020)	$ 10,000						0.02					
Conduct CBSM	Conduct CBSM (community-based social marketing) to meet future permit requirements. Assumes 100 consultant hours at $100 per hour and 30 percent staff hours for project management. (February 2021)		$ 10,000						0.02				
Minimum Tier Total		**$ 30,000**	**$ 10,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.05**	**0.02**				
Moderate		**Moderate**						**Moderate**					
All Public Education activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum tier (NPDES Compliant).	$ 30,000	$ 10,000	$ -	$ -	$ -	$ -	0.05	0.02				
Kiosk materials and events	Update kiosk materials and attend events. Assumes 40 consultant hours at $100 per hour, plus $1,000 for material and 30 percent staff hours for project management. Assumes 4 events per year require 10 hours of staff time per event.		$ 5,000						0.03	0.02	0.02	0.02	0.02
Reevaluate current materials	Reevaluate current education and outreach materials. Assumes 1 day to review existing material and 4 days to update/develop new City-specific material leveraging new regional education material.							0.02	0.02	0.02	0.02	0.02	0.02
Social media outreach	Assumes 40 consultant hours at $100 per hour to develop promotional material and 30 percent staff hours for project management. Assumes 16 hours per month of staff time for 2 social media activities per month.		$ 4,000						0.12	0.11	0.11	0.11	0.11
Hall Lake fish hatchery engagement	Engage residents/students to participate in Hall Lake fish hatchery once it is up and running. Use existing staff and funding to support, no additional staffing and funding needed.												
Moderate Tier Total		**$ 30,000**	**$ 19,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.07**	**0.19**	**0.15**	**0.15**	**0.15**	**0.15**

Enhanced		Enhanced						Enhanced					
All Public Education Activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum tier (NPDES Compliant).	$ 30,000	$ 10,000	$ -	$ -	$ -	$ -	0.05	0.02				
Kiosk materials and events	Same assumptions as Moderate tier		$ 5,000						0.04	0.03	0.03	0.03	0.03
Develop new materials	Develop new education and outreach materials. Assumes 100 consultant hours at $100 per hour on an annual basis and 30 percent staff hours for project management.		$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000		0.02	0.02	0.02	0.02	0.02
Expand Nature Vision program	Expand funding for Nature Vision program. Additional $5,000 per year to expand the program, which is currently $5,000 per year. Assumes 40 additional staff hours to manage the program		$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000		0.02	0.02	0.02	0.02	0.02
Add more programs	Increase the number of public education and outreach programs. Assumes 100 consultant hours at $100 per hour on an annual basis, plus 0.25 FTE City staff to present materials to the public		$ 10,000	$ 10,000	$ 10,000	$ 10,000	$ 10,000		0.25	0.25	0.25	0.25	0.25
Targeted social media outreach	Expand social media outreach including developing a targeted campaign on ongoing outreach. Assumes 200 consultant hours at $100 per hour to provide recommended approach and initial campaign, plus 0.25 FTE City staff to implement program	$ 20,000						0.25	0.25	0.25	0.25	0.25	0.25
Adopt a Stream program	Develop and implement an Adopt a Stream/Wetland or similar program. Assumes $1,000 for printed materials (brochures, signs, etc.), 0.25 FTE City staff to implement program		$ 1,000	$ 1,000	$ 1,000	$ 1,000	$ 1,000		0.25	0.25	0.25	0.25	0.25
LID retrofit program	Expand rain garden program into an LID retrofit program that includes additional LID BMPs. Assumes $5,000 for printed materials (brochures, Rain Garden handbooks, etc.), 0.5 FTE City staff to implement program		$ 5,000	$ 5,000	$ 5,000	$ 5,000	$ 5,000		0.50	0.50	0.50	0.50	0.50
Enhanced Tier Total		**$ 50,000**	**$ 46,000**	**$ 31,000**	**$ 31,000**	**$ 31,000**	**$ 31,000**	**0.30**	**1.35**	**1.32**	**1.32**	**1.32**	**1.32**

Table 3. Recommended Activities for Public Involvement and Participation.		Funding						Staff (FTE)					
Recommendation	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Moderate		**Moderate**						**Moderate**					
Parks Advisory Board	Report out to Parks Advisory Board (citizen panel). Assumes 2 meetings per year. Each requires 4 hours for meeting attendance and 8 hours for meeting preparation and correspondence.								0.01	0.01	0.01	0.01	0.01
Moderate Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
Enhanced		**Enhanced**						**Enhanced**					
Parks Advisory Board	Same assumptions as Moderate								0.01	0.01	0.01	0.01	0.01
Citizen Advisory Group	Reactivate and engage Citizen Advisory Group. Assumes 12 meetings per year. Each requires 4 hours for meeting attendance and 8 hours for meeting preparation and correspondence.								0.08	0.08	0.08	0.08	0.08
Enhanced Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**		**0.10**	**0.10**	**0.10**	**0.10**	**0.10**

Table 4. Recommended Activities for Illicit Discharge Detection and Elimination.		Funding						Staff (FTE)					
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**						**Minimum (NPDES Compliant)**					
Checkbox on CB form	Modify catch basin inspection form to include illicit discharge checkbox. Use existing staff and funding to support; no additional staffing and funding needed												
Training for field staff	Develop and implement on-going IDDE training program for field staff. Assumes 40 consultant hours at $100/hour to develop materials and present initial training and 30 percent staff hours for project management, annual staff time and needed to conduct future trainings	$ 4,000						0.02	0.01	0.01	0.01	0.01	0.01
Minimum Tier Total		**$ 4,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**0.02**	**0.01**	**0.01**	**0.01**	**0.01**	**0.01**
Moderate		**Moderate**						**Moderate**					
All IDDE activities from Minimum (NPDES Compliant) tier	Same assumptions as Minimum (NPDES Compliant).	$ 4,000	$ -	$ -	$ -	$ -	$ -	0.02	0.01	0.01	0.01	0.01	0.01
Training for Fire Dept. and Building Inspectors	Develop a more formal training program for Fire Department and Building Inspectors. Assumes 40 consultant hours at $100/hour to develop materials and present initial training with 15 percent staff hours for project management; annual staff time to update training material and conduct future trainings.		$ 4,000						0.04	0.03	0.03	0.03	0.03
Collect additional attribute data	Expand attribute data collected (storage volume, etc.). Assumes inspection of the 4,700 CBs in the City at 5 minutes per CB.								0.11	0.11	0.11	0.11	0.11
Track issues through work orders	Track IDDE issues through work orders and asset management. Assumes 6 issues per year at 16 hours per issue and 8 hours per year for information management.								0.06	0.06	0.06	0.06	0.06
Moderate Tier Total		**$ 4,000**	**$ 4,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.02**	**0.22**	**0.21**	**0.21**	**0.21**	**0.21**

Enhanced		Enhanced						Enhanced					
All IDDE activities from Moderate tier	Same assumptions as Moderate.	$ 4,000	$ 4,000	$ -	$ -	$ -	$ -	0.02	0.22	0.21	0.21	0.21	0.21
Review CCTV data	Review CCTV data collected as part of the asset management program for illicit connections. Includes staff time to review CCTV data for illicit connections. Funding for CCTV data collection included in the Maintenance and Operations: Asset Management program area.										0.25	0.25	0.25
Enhanced training	Develop an enhanced internal IDDE training program. Assumes 80 hours per year for staff to update the training material with lessons learned (20 hours), plan and administer training (20 hours), attend the training (40 hours for 10 staff x 4 hours).										0.05	0.05	0.05
Enhanced Tier Total		**$ 4,000**	**$ 4,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.02**	**0.22**	**0.21**	**0.51**	**0.51**	**0.51**

Table 5a. Recommended SWMP Activities for Controlling Runoff from New Development, Redevelopment, and Construction Sites.		Funding						Staff (FTE)					
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**						**Minimum (NPDES Compliant)**					
Private SW plan review	Document and implement a site plan review process for private Stormwater Site Plans. Some documentation for City projects has been prepared as part of the SWMCP update. Includes one-time work for staff to develop documents that are specific to private site plans and implement the plans. Includes annual effort of 4 hours per project for 20 projects per year for documentation and 20 hours of staff time per year for annual process improvement.							0.10	0.06	0.06	0.06	0.06	0.06
Supplemental Stormwater Guidelines	Develop and adopt Supplemental Stormwater Guidelines. Assumes 1,000 consultant hours at $100/hour and 15 percent staff time to manage the project. Annual cost to review submittals against updated standards of 16 hours per project for 20 projects.	$ 100,000						0.08	0.18	0.18	0.18	0.18	0.18
Stormwater plan review checklist(s).	Update and develop new stormwater plan review checklist(s). Assumes 150 consultant hours at $100/hour and 15 percent staff time to manage the project.		$ 15,000						0.05				
CIP SW review	Document an implement a site plan review process for Public (CIP) Stormwater Site Plans. A process has been defined for City projects as part of the SWMCP update. Includes one-time work for staff to implement the process. Includes annual effort of 16 hours per project for 20 projects per year in addition to 20 hours of staff time for annual process improvement.								0.02	0.19	0.19	0.19	0.19
Training for plan reviewers and inspectors.	Develop and implement on-going training program for plan reviewers, construction site inspectors, and private stormwater facility maintenance inspectors. Assumes 80 consultant hours at $100/hour and 30 percent staff time to manage the project to develop training material and conduct initial training. Includes annual staff time needed to update training material, conduct future trainings, and attend trainings.		$ 8,000						0.01	0.02	0.02	0.02	0.02
SFR SW facility program	Implement SFR stormwater facility inspection and maintenance program. Hours based on results of Task 5.2. compliance approach Alternative 3, where the City assumes responsibility for maintenance and operation of private facilities.	$ 100						0.60	1.10	0.48	0.48	0.48	0.48
Minimum Tier Total		**$ 100,100**	**$ 23,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.79**	**1.42**	**0.94**	**0.94**	**0.94**	**0.94**

Moderate		Moderate						Moderate					
All New Development, Redevelopment, and Construction Site Activities from Minimum tier.	Same assumptions as Minimum.	$ 100,100	$ 23,000	$ -	$ -	$ -	$ -	0.79	1.42	0.94	0.94	0.94	0.94
Feasibility guidelines	Develop guidelines for feasibility and site testing. Assumes 50 consultant hours at $100/hour and 30 percent staff time for project management.		$ 5,000						0.01				
LID technical assistance	Provide LID technical assistance at the permit counter and assistance in the field. Assumes 80 consultant hours at $100/hour and 30 percent staff time for project management to develop materials, existing staff to support providing materials at permit counter. Assume assistance is provided to 10 projects per year and 8 hours per project.		$ 8,000						0.01	0.05	0.05	0.05	0.05
Add website links	Provide links to other resources on City website.								0.00				
Early project involvement	Become more involved with project design and ramp-up to find opportunities for partnerships (retrofits, LID pilot projects, demonstration projects). Assumes attendance at biweekly project coordination meeting takes 2 hours per meeting.								0.03	0.03	0.03	0.03	0.03
Inspection checklists	Modify/update construction site inspection checklists. Assumes 50 consultant hours at $100/hour and 30 percent staff time for project management.		$ 5,000						0.01				
CESCL training	Require consultants conducting construction site inspections for public (CIP) projects to have CESCL training.								0.005	0.005	0.005	0.005	0.005
Moderate Tier Total		**$ 100,100**	**$ 41,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.79**	**1.49**	**1.02**	**1.02**	**1.02**	**1.02**
Enhanced		**Enhanced**						**Enhanced**					
All New Development, Redevelopment, and Construction Site Activities from Moderate tier.	Same assumptions as Moderate.	$ 100,100	$ 41,000	$ -	$ -	$ -	$ -	0.79	1.49	1.02	1.02	1.02	1.02
Expand LID toolkit	Expand the LID toolkit (resource list, modeling software training, and videos). Assumes 200 consultant hours at $100/hour and 15 percent staff time for project management to provide list of recommendations, City staff time needed to add resource links to website.		$ 20,000						0.017	0.005	0.005	0.005	0.005
Enhanced Tier Total		**$ 100,100**	**$ 61,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.79**	**1.51**	**1.02**	**1.02**	**1.02**	**1.02**

Table 5b. Recommended Maintenance and Operations Activities for Controlling Runoff from New Development, Redevelopment, and Construction Sites.		Funding						Staff (FTE)					
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum		**Minimum**						**Minimum**					
SFR inspection and maintenance program	Annual work to implement SFR inspection and maintenance program. Average annual cost to maintain private stormwater ponds during first 5 years based on results of Task 5.2. compliance approach Alternative 3, where the City assumes responsibility for maintenance and operation of private facilities.	$ 86,000	$ 55,300	$ 55,300	$ 55,300	$ 55,300	$ 55,300		0.23	0.23	0.23	0.23	0.23
Minimum Tier Total		**$ 86,000**	**$ 55,300**	**$ 55,300**	**$ 55,300**	**$ 55,300**	**$ 55,300**		**0.23**	**0.23**	**0.23**	**0.23**	**0.23**
Moderate		**Moderate**						**Moderate**					
All New Development, Redevelopment, and Construction Site Activities from Minimum tier	Same assumptions as Minimum.	$ 86,000	$ 55,300	$ 55,300	$ 55,300	$ 55,300	$ 55,300		0.23	0.23	0.23	0.23	0.23
Moderate Tier Total		**$ 86,000**	**$ 55,300**	**$ 55,300**	**$ 55,300**	**$ 55,300**	**$ 55,300**		**0.23**	**0.23**	**0.23**	**0.23**	**0.23**
Enhanced		**Enhanced**						**Enhanced**					
All New Development, Redevelopment, and Construction Site Activities from Minimum tier	Same assumptions as Minimum.	$ 86,000	$ 55,300	$ 55,300	$ 55,300	$ 55,300	$ 55,300		0.23	0.23	0.23	0.23	0.23
Enhanced Tier Total		**$ 86,000**	**$ 55,300**	**$ 55,300**	**$ 55,300**	**$ 55,300**	**$ 55,300**		**0.23**	**0.23**	**0.23**	**0.23**	**0.23**

Table 6. Recommended Activities for Inspections and Maintenance of Stormwater Facilities.		Funding						Staff (FTE)					
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**						**Minimum (NPDES Compliant)**					
Annual facility inspections	Increase inspection frequency of all City-owned flow control and water quality treatment stormwater facilities (detention tank/vault/pipe, media filter vaults, and oil/water separators) to annual. Assumes 130 facilities estimated to take approximately 300 hours more than current level of effort.							0.17	0.17	0.17	0.17	0.17	0.17
Facility M&O manuals	Develop M&O manuals for City-owned flow control and water quality treatment stormwater facilities. Assumes 100 facilities need M&O Manuals (number of facilities expected to increase due to unmapped facilities), develop template for each BMP type, gather site specific info, apply to 100 facilities, 400 consultant hours at $100/hour and 15 percent staff hours to manage the project, City staff support for initial review (and update in subsequent years).	$ 40,000						0.11	0.05	0.05	0.05	0.05	0.05
M&O training program	Ongoing training program to select appropriate BMPs, prevent or minimize water quality impacts, and reporting procedures. Assumes 40 consultant hours at $100/hour and 30 percent staff hours to manage the project to develop materials and present initial training; existing staff and funding to conduct future trainings. Assumes 20 staff trained per year and time charged to SW utility.		$ 4,000						0.01	0.09	0.09	0.09	0.09
Increase maintenance frequency	Maintain water quality and flow control facilities as needed. Assumes 10% of city-owned facilities will need to be maintained every year. Major maintenance would fall under the CIP or asset management program and is not included here.	$ 8,000	$ 8,000	$ 8,000	$ 8,000	$ 8,000	$ 8,000	0.05	0.05	0.05	0.05	0.05	0.05
Minimum Tier Total		**$ 48,000**	**$ 12,000**	**$ 8,000**	**$ 8,000**	**$ 8,000**	**$ 8,000**	**0.33**	**0.27**	**0.35**	**0.35**	**0.35**	**0.35**

Moderate		Moderate						Moderate					
All Routine Inspections and Maintenance Activities (same as Minimum)	Same assumptions as Minimum.	$ 48,000	$ 12,000	$ 8,000	$ 8,000	$ 8,000	$ 8,000	0.33	0.27	0.35	0.35	0.35	0.35
Optimize CB cleaning	Document results of each catch basin inspection so that the catch basin inspection and cleaning schedule can be optimized. Assumes 4 to 6 years of improved documentation to justify a more strategic and lower cost inspection schedule afterwards.									0.25	0.25	0.25	0.25
Expanded training program	Ongoing training program (expanded from Minimum to include LID facility inspections and maintenance). Assumes 40 consultant hours at $100/hour to develop additional curriculum and 30 percent staff time for project management, plus the 40 consultant hours included for the Minimum training program to develop materials and present initial training, additional staff time needed to conduct future trainings.	$ 4,000						0.01	0.01	0.01	0.01	0.01	0.01
Vegetation maintenance	Seasonal vegetation maintenance for bioretention facilities. Assumes 4 weeks per year (1 week per season) x 2 staff, no additional equipment needed.								0.18	0.18	0.18	0.18	0.18
Moderate Tier Total		**$ 52,000**	**$ 12,000**	**$ 8,000**	**$ 8,000**	**$ 8,000**	**$ 8,000**	**0.33**	**0.46**	**0.79**	**0.79**	**0.79**	**0.79**
Enhanced		**Enhanced**						**Enhanced**					
All Routine Inspections and Maintenance Activities from Moderate tier	Same assumptions as Moderate.	$ 52,000	$ 12,000	$ 8,000	$ 8,000	$ 8,000	$ 8,000	0.33	0.46	0.79	0.79	0.79	0.79
Permeable pavement maintenance	Purchase equipment for maintaining permeable pavement. Triverus Municipal Cleaning Vehicle = $225K, Cyclone Technology = $135-146K, Cyclone trailer = $50K, Cyclone walk-behind = $13K; assume middle of the road equipment and 0.25 FTE staff time for operation.					$ 150,000						0.25	0.25
Enhanced Tier Total		**$ 52,000**	**$ 12,000**	**$ 8,000**	**$ 8,000**	**$ 158,000**	**$ 8,000**	**0.33**	**0.46**	**0.79**	**0.79**	**1.04**	**1.04**

Table 7. Recommended Activities for M&O Documentation.		Funding						Staff (FTE)					
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**						**Minimum (NPDES Compliant)**					
Update SWPPPs	Update municipal Stormwater Pollution Prevention Plans (SWPPPs) for the UMC and WWTP. Assumes 40 consultant hours at $100/hour and 30 percent staff time for project management to update SWPPPs.		$ 4,000						0.01				
SWPPP inspections	Conduct wet and dry weather inspection as outlined in the SWPPPs for the UMC and WWTP. The SWPPP for the UMC and the WWTP requires quarterly inspections during storm events and one dry-weather inspection each year of all BMPs (8 hours assumed per sampling event).									0.05	0.05	0.05	0.05
SWPPP spill history	Update spill history record for the UMC and WWTP								0.00				
SOPs for City activities	Develop Standard Operating Procedures (SOPs) for City activities. Assuming all 15 generic activities in the NPDES permit apply and that SOPs are developed for each activity, assume 8 hours per sctivity to develop SOPs.							0.07	0.01	0.01	0.01	0.01	0.01
Minimum Tier Total		**$ -**	**$ 4,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.07**	**0.02**	**0.05**	**0.05**	**0.05**	**0.05**
Moderate		**Moderate**						**Moderate**					
All M&O Documentation Activities from Minimum tier	Same assumptions as Minimum.	$ -	$ 4,000	$ -	$ -	$ -	$ -	0.07	0.02	0.05	0.05	0.05	0.05
Ongoing SWPPP updates	Review and update SWPPPs for the UMC and WWTP if operations or storage at the facilities changes, or if significant staffing changes occur									0.01	0.01	0.01	0.01
Update SOPs	Review and update SOPs every 5 years. Cost and staff time depend on above activities.												0.01
Tablet training for field staff	Tablets and software for data collection in the field (funding included in Recordkeeping program area). Assumes 5 staff times 16 hours of training per staff. Funding for tablets and software included in Recordkeeping program area.							0.05	0.05	0.05	0.05	0.05	0.05
Moderate Tier Total		**$ -**	**$ 4,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.11**	**0.06**	**0.11**	**0.11**	**0.11**	**0.12**
Enhanced		**Enhanced**						**Enhanced**					
All M&O Documentation activities from Moderate tier	Same assumptions as Moderate.	$ -	$ 4,000	$ -	$ -	$ -	$ -	0.11	0.06	0.11	0.11	0.11	0.12
Enhanced Tier Total		**$ -**	**$ 4,000**	**$ -**	**$ -**	**$ -**	**$ -**	**0.11**	**0.06**	**0.11**	**0.11**	**0.11**	**0.12**

Table 8. Recommended Activities for Asset Management and Mapping.		Funding						Staff Hours					
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**						**Minimum (NPDES Compliant)**					
Map outfall attributes	Map size and material for all known MS4 outfalls. City staff time estimated at 0.25 FTE. (Due January 2020)							0.25					
Map private connections	Complete mapping of all known connections from the MS4 to a privately-owned stormwater system. City staff time estimated at 0.25 FTE. (Due August 2023)										0.25		
Minimum Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**0.25**			**0.25**		
Moderate		**Moderate**						**Moderate**					
All activities from Minimum tier	Same assumptions as Minimum tier (NPDES Compliant).	$ -	$ -	$ -	$ -	$ -	$ -	0.25			0.25		
Data entry and inspection schedule	Enter and manage all stormwater facility and conveyance data, prioritize and schedule inspections[d]. Assumes a full FTE during the data collection phase of the Asset Management Program. Staff time may be reduced after initial system inspection is complete. This staff member may be housed in Surface Water Management/Engineering, but kept with the mapping requirements (under M&O) for now.								1.00	1.00	1.00	1.00	1.00
CCTV inspections	Hire a contractor/set up a small works contract to collect field data (measurements and CCTV)[d]. Assumes that a contractor is hired and no City equipment purchase is needed, $300K cost may decrease for future rounds/reinspections. Annual staff hours are assumed for management of the contract.		$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000		0.25	0.25	0.25	0.25	0.25
Moderate Tier Total		**$ -**	**$ 300,000**	**$ 300,000**	**$ 300,000**	**$ 300,000**	**$ 300,000**	**0.25**	**1.25**	**1.25**	**1.50**	**1.25**	**1.25**
Enhanced		**Enhanced**						**Enhanced**					
Collect Data													
All activities from Moderate tier	Same asumptions as Moderate tier.	$ -	$ 300,000	$ 300,000	$ 300,000	$ 300,000	$ 300,000	0.25	1.25	1.25	1.50	1.25	1.25
Analyze/Manage Data													
Prioritize maintenance	Prioritize maintenance and CIPs based on asset inventory attributes. Assumes 0.15 FTE, this staff member may be housed in Surface Water Management/Engineering, but kept under M&O for now.									0.15	0.15	0.15	0.15
Update CIP list	Add replacement/repair projects to City's Surface Water CIP list. Assumes 0.15 FTE, this staff member may be housed in Surface Water Management/Engineering, but kept under M&O for now.									0.15	0.15	0.15	0.15
Enhanced Tier Total		**$ -**	**$ 300,000**	**$ 300,000**	**$ 300,000**	**$ 300,000**	**$ 300,000**	**0.25**	**1.25**	**1.55**	**1.80**	**1.55**	**1.55**

Table 9. Recommended Activities for Reporting.		Funding						Staff (FTE)					
Recommendation	**Assumptions**	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**						**Minimum (NPDES Compliant)**					
No gaps identified.													
Minimum Tier Total		**$ -**	**$ -**	**$ -**	**$ -**	**$ -**	**$ -**						
Moderate		**Moderate**						**Moderate**					
Tablets and software	Tablets and software for data collection in the field. No paper forms or manual data entry. Assumes 5 iPads with waterproof Otter box and tempered glass and 2-year AppleCare++ protection plan, annual ESRI license for 5 users. Training for M&O and inspectors included under those program areas.	$ 8,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000						
Recordkeeping guidelines	Develop recordkeeping guidelines and requirements. Assumes ongoing work to prepare and update (80 hours per year).							0.05	0.05	0.05	0.05	0.05	0.05
QA/QC procedures.	QA/QC procedures/checks. Assumes ongoing work to implement (40 hours per quarter).								0.09	0.09	0.09	0.09	0.09
Project closeout procedures	Develop and implement consistent project closeout procedures and nomenclature/project naming. Assumes dedicated staff to implement improved project closeout procedures.							0.50	0.25	0.25	0.25	0.25	0.25
Moderate Tier Total		**$ 8,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**	**0.55**	**0.39**	**0.39**	**0.39**	**0.39**	**0.39**
Enhanced		**Enhanced**						**Enhanced**					
All Record Keeping activities from Moderate tier.	Same assumptions as Moderate.	$ 8,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	$ 3,000	0.55	0.39	0.39	0.39	0.39	0.39
Enhanced Tier Total		**$ 8,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**	**$ 3,000**	**0.55**	**0.39**	**0.39**	**0.39**	**0.39**	**0.39**

Table 10. Recommended Activities for Stormwater Planning.		Funding						Staff (FTE)					
Recommendation	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**						**Minimum (NPDES Compliant)**					
Annual LID review	Develop a framework for LID review of all new policies and continue annual review of new code and documents. Assumes $20,000 one-time effort with consultant support and one-time City staff time estimated at 40 hours. Assumes 40 hours per year for ongoing annual review.	$ 20,000						0.02	0.02	0.02	0.02	0.02	0.02
Inter-disciplinary team	Convene an inter-disciplinary team to advise the SWMP. Assumes that this team will include approximately 10 staff that will meet quarterly for 2 hours, but only 4 staff will record their time to the SWM Utility. (Due August 2020)							0.02	0.02	0.02	0.02	0.02	0.02
Long-range planning annual report questions	Answer annual report questions with the 2021 annual report to Ecology summarizing coordination with long-range planning efforts. Assumes $5,000 of consultant support plus 40 staff hours for management. (Responses due March 2021)	$ 5,000						0.02					
Long-range planning report	Prepare report in 2022 summarizing coordination with long-range planning efforts. Assumes $5,000 of consultant support plus 40 staff hours for management. (Report due January 2023)			$ 5,000						0.02			
SMAP	Stormwater management action planning (SMAP): priority watershed plan development. Assumes $100,000 planning effort with consultant support and one-time City staff time estimated at 0.25 FTE. Additional City staff time is included for possible revisions and modifications to the previously prepared plan on the Scriber Creek Corridor. (March 2022 - March 2023)			$ 100,000						0.25			
Minimum Tier Total		**$ 25,000**	**$ -**	**$ 105,000**	**$ -**	**$ -**	**$ -**	**0.06**	**0.04**	**0.31**	**0.04**	**0.04**	**0.04**
Moderate		**Moderate**						**Moderate**					
Same as Minimum (NPDES Compliant)	Same assumptions as Minimum (NPDES Compliant).	$ 25,000	$ -	$ 105,000	$ -	$ -	$ -	0.06	0.04	0.31	0.04	0.04	0.04
Moderate Tier Total		**$ 25,000**	**$ -**	**$ 105,000**	**$ -**	**$ -**	**$ -**	**0.06**	**0.04**	**0.31**	**0.04**	**0.04**	**0.04**
Enhanced		**Enhanced**						**Enhanced**					
Same as Minimum (NPDES Compliant)	Same assumptions as Minimum (NPDES Compliant).	$ 25,000	$ -	$ 105,000	$ -	$ -	$ -	0.06	0.04	0.31	0.04	0.04	0.04
Enhanced Tier Total		**$ 25,000**	**$ -**	**$ 105,000**	**$ -**	**$ -**	**$ -**	**0.06**	**0.04**	**0.31**	**0.04**	**0.04**	**0.04**

Table 11. Recommended Activities for Source Control Program for Existing Development.		Funding						Staff Hours					
Recommendation	Assumptions	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
		2020	2021	2022	2023	2024	2025	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)		**Minimum (NPDES Compliant)**						**Minimum (NPDES Compliant)**					
Business inventory	Develop and maintain source control inventory. Dedicated initial staff time to develop the inventory and update the inventory annually.									0.25			
Ordinance and enforcement policy	Develop ordinance and enforcement policy. Assumes ongoing work to review and update the ordinance.									0.05	0.05	0.05	0.05
Training program	Develop and implement on-going training program. Assumes 80 consultant hours at $100/hour and 30 percent staff time for project management to develop materials and present initial training, 0.10 FTE to conduct future trainings and research/attend external trainings.			$ 8,000						0.01	0.10	0.10	0.10
Implement program	Implement business inspection program. Assumes 0.5 FTE for implementation.										0.50	0.50	0.50
Minimum Tier Total		**$ -**	**$ -**	**$ 8,000**	**$ -**	**$ -**	**$ -**			**0.31**	**0.65**	**0.65**	**0.65**
Moderate		**Moderate**						**Moderate**					
Same as Minimum (NPDES Compliant)	Same assumptions as Minimum (NPDES Compliant).	$ -	$ -	$ 8,000	$ -	$ -	$ -			0.31	0.65	0.65	0.65
Moderate Tier Total		**$ -**	**$ -**	**$ 8,000**	**$ -**	**$ -**	**$ -**			**0.31**	**0.65**	**0.65**	**0.65**
Enhanced		**Enhanced**						**Enhanced**					
Same as Minimum (NPDES Compliant)	Same assumptions as Minimum (NPDES Compliant).	$ -	$ -	$ 8,000	$ -	$ -	$ -			0.31	0.65	0.65	0.65
Enhanced Tier Total		**$ -**	**$ -**	**$ 8,000**	**$ -**	**$ -**	**$ -**			**0.31**	**0.65**	**0.65**	**0.65**

Table 12. Summary of Outside Support and Equipment Cost						
Program Area	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)						
M&O	$134,000	$71,300	$63,300	$63,300	$63,300	$63,300
SWMP	$159,100	$33,000	$113,000	$0	$0	$0
Minimum Tier Total	**$293,100**	**$104,300**	**$176,300**	**$63,300**	**$63,300**	**$63,300**
Moderate						
M&O	$138,000	$371,300	$363,300	$363,300	$363,300	$363,300
SWMP	$167,100	$67,000	$116,000	$3,000	$3,000	$3,000
Moderate Tier Total	**$305,100**	**$438,300**	**$479,300**	**$366,300**	**$366,300**	**$366,300**
Enhanced						
M&O	$138,000	$371,300	$363,300	$363,300	$513,300	$363,300
SWMP	$187,100	$114,000	$147,000	$34,000	$34,000	$34,000
Enhanced Tier Total	**$325,100**	**$485,300**	**$510,300**	**$397,300**	**$547,300**	**$397,300**

Table 13. Summary of Staffing Needs (FTE)						
Program Area	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
	2020	2021	2022	2023	2024	2025
Minimum (NPDES Compliant)						
M&O	0.65	0.51	0.63	0.88	0.63	0.63
SWMP	0.92	1.49	1.57	1.63	1.63	1.63
Minimum Tier Total	**1.57**	**2.00**	**2.20**	**2.52**	**2.27**	**2.27**
Moderate						
M&O	0.70	2.00	2.38	2.63	2.38	2.39
SWMP	1.49	2.34	2.40	2.47	2.47	2.47
Moderate Tier Total	**2.19**	**4.34**	**4.78**	**5.10**	**4.85**	**4.86**
Enhanced						
M&O	0.70	2.00	2.68	2.93	2.93	2.94
SWMP	1.72	3.60	3.66	4.02	4.02	4.02
Enhanced Tier Total	**2.41**	**5.60**	**6.34**	**6.95**	**6.95**	**6.96**

APPENDIX F

Capital Improvement Program Appendix

CAPITAL IMPROVEMENT PROGRAM APPENDIX

Identify Problems

Previous stormwater plans and input from City staff were used to develop an initial list of problems to be addressed during work on this plan. Stormwater plans reviewed were the City's 2009 Surface Water Management Comprehensive Plan, City of Lynnwood 2017–2022 Capital Facilities Plan (CFP), Scriber Creek Corridor Management Plan, and Perrinville Creek Stormwater Flow Reduction Retrofit study (Perrinville Creek Study). Problems were evaluated using desktop methods and field evaluation to assess site-specific opportunities and constraints.

Project Prioritization

The stormwater CIP problems and solutions were prioritized using a qualitative process and considering input from City staff, review of background documents, and field reconnaissance of existing problems. The objective was to rank the proposed projects into tiers of service (Minimum, Moderate, or Enhanced) and to develop a schedule for project implementation within each tier.

Each project was evaluated against the following primary and secondary prioritization criteria to assign project priority:

Primary Prioritization Criteria

The primary prioritization criteria are related to the risk associated with the problem that is being solved: likelihood of the problem occurring (i.e., probability) and the potential losses resulting from the problem (i.e. severity). Projects that address frequent problems with major potential losses have higher risk reduction benefit, and thus are typically assigned a higher priority. Projects that address less frequent problems with minor potential losses have lower risk, and thus are typically assigned a lower priority.

Probability: Probability of the problem occurring was evaluated qualitatively, based on the perceptions of City staff. Problems that occur more frequently were assigned a higher priority.

Severity: Consideration of severity involved qualitatively assessing the potential losses associated with the problem. Problems with greater potential losses were assigned a higher priority.

Relating Project Benefits to Program Goals. Probability and severity were considered in the context of the following goals:

- Flooding is reduced
- Water quality is improved
- Aquatic Habitat conditions are improved
- Infrastructure is upgraded, protected, and maintained

Each project was assigned a score of high, medium, or low based on the primary prioritization criteria.

Secondary Prioritization Criteria

Secondary prioritization criteria were used to refine project prioritization into tiers of service and develop the implementation schedule through qualitative examination of goals related to Public Participation and Comprehensive Planning, Administration, and Funding:

- **Public Participation:**
  - Will the project educate public about storm water?
  - Will the project provide an opportunity for stewardship activities?
- **Comprehensive Planning, Administration, and Funding:**
  - Are there other project benefits to the community? (e.g., enhance open space, connect greenways, improve walkability, provide wildlife corridors)
  - Will the project enhance social equity?
  - Can the project be scheduled to coincide with other City projects such that the total cost of both projects is reduced? (e.g., scheduling a drainage improvement project before an overlay project)
  - Is the project a candidate for outside grant funding that will magnify the benefits of utility funds?
  - Do we understand the problem well enough to design and implement an effective solution?

The results of the prioritization process are shown in the Prioritization Matrix below.

Solution Development

Conceptual designs and cost estimates for capital projects were developed for the prioritized stormwater problems.

Conceptual Designs

Sites associated with stormwater problems were visited by Herrera staff to determine the potential cause(s) of the problems. Engineering judgment was then used to identify appropriate capital projects to address each stormwater problem, factoring in constraints and opportunities at each site. For some projects, multiple alternatives were considered.

Conceptual designs were developed for each project, using sound engineering judgement and desktop and field assessment. Each conceptual design includes a project summary sheet (problem description, and a list of the primary project components), a plan view figure of the stormwater facilities with dimensions (when applicable), and an itemized planning-level cost estimate (when applicable). Summary sheets and cost estimates are available in Appendix H.

Conceptual Cost Estimates

Costs for capital projects were estimated in different ways, depending on the type of project and project development history. The 14 project designs and cost estimates previously developed for the Scriber Creek Corridor Management Plan and the Perrinville Creek Study were adopted without major modification in this CIP, and costs were converted to December 2018 dollars. Cost-based methods were used for 3 of the remaining 10 projects, and parametric estimates were used for 2 projects with recent, similar projects completed in the City. The remaining 4 projects are not construction-related, and cost estimates were developed using Herrera's experience with similar studies and plans.

Cost-based estimates were prepared based upon Herrera's experience in designing projects of a similar scale and in similar settings. Unless otherwise noted in the cost estimates, the following assumptions were applied:

- Construction bid items were based on WSDOT standard specifications where applicable, including material, construction requirements, measurement, and payment.
- Line item unit prices used in the construction cost estimates were developed with sound engineering judgment and were derived from a combination of applicable sources, including contractor bid tabs from similar past projects, prices compiled by WSDOT and Seattle Public Utilities, quotes from vendors, a cost estimating guide (The Guide 2018), site-specific understanding of probable contractor staging, access, and other project-specific requirements and constraints that would affect contractor bids for the project.
- Allied costs (project management, survey, geotechnical analyses, design, permitting, and construction management) were included for each project, as appropriate.
- The City would hire a consultant to perform the survey, geotechnical analysis, design, and permitting.

- The City would manage the project for a cost equal to 10 percent of the construction cost and would hire a consultant to perform construction management for a cost equal to 10 percent of the construction cost.

- Costs for survey, geotechnical analyses, design, and permitting were based on experience with design and permitting for similar projects and knowledge of site-specific job complexities and challenges. In some cases, professional judgment was used to estimate allied costs as a percentage of construction costs.

- For projects where cost-based methods were used (i.e., projects with itemized cost estimates) a 30 percent to 50 percent design contingency factor was applied to construction costs to reflect the level of uncertainty associated with the project scope and potential risks. Contingency values are in line with recommendations by the Association for the Advancement of Cost Engineering (AACE 2005; Rothwell 2005).

- Property acquisition costs were not considered and may affect actual costs for some projects.

REFERENCES

AACE. 2005. Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries, AACE International Recommended Practice No. 18R-97, TCM Framework: 7.3 – Cost Estimating and Budgeting. Association for the Advancement of Cost Engineering (AACE) International. February 2, 2005.

Rothwell, G. 2005. Contingency in Levelized Capital Cost Estimation. 2005 Association for the Advancement of Cost Engineering (AACE) International Transactions.

The Guide. Building Construction Material Prices for use in Alaska, Oregon and Washington since 1984. January 2018.

Project Priority Matrix

Project Name	Primary Criteria		P.C. Score	Secondary Criteria		Remarks	Cost Estimate	Rank
				Public Participation	Comp. Planning , Admin., and Funding			
180th St SW Bioretention Swale	Problems Solved	Runoff management and sidewalk improvement. Preventing sediments, oils and metals entering Scriber Creek	Low	☐ Will the project educate public about storm water? ☐ Will the project provide an opportunity for stewardship activities?	☑ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?	Identified as a retrofit project	$210,000.00	8
	Benefits	☐ Flooding is reduced ☑ Water quality is improved ☐ Aquatic Habitat conditions are improved ☑ Infrastructure is upgraded, protected, and maintained						
Golde Creek Stormwater Pond Retrofit	Problems Solved	Water quality degradation through urban runoff. Potential source of fecal coliform in swamp creek downstream. Unmaintained and unfunctional pond.	Medium	☐ Will the project educate public about storm water? ☐ Will the project provide an opportunity for stewardship activities?	☐ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?		$400,000.00	6
	Benefits	☐ Flooding is reduced ☑ Water quality is improved ☐ Aquatic Habitat conditions are improved ☑ Infrastructure is upgraded, protected, and maintained						
Street Edge Runoff Treatment Retrofits in the Hall Lake Basin	Problems Solved	Nutrient, bacteria. Metals in storm runoff. Category 5 listings for fecal coliform	Low	☐ Will the project educate public about storm water? ☐ Will the project provide an opportunity for stewardship activities?	☐ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?		$700,000 to $1,700,000	7
	Benefits	☐ Flooding is reduced ☑ Water quality is improved ☐ Aquatic Habitat conditions are improved ☑ Infrastructure is upgraded, protected, and maintained						
Lake Management Plan for Scriber Lake	Problems Solved	Low levels of dissolved oxygen . Unsuccessful previous treatments. Total phosphorus	High	☑ Will the project educate public about storm water? ☐ Will the project provide an opportunity for stewardship activities?	☑ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?		$60,000.00	2
	Benefits	☐ Flooding is reduced ☑ Water quality is improved ☑ Aquatic Habitat conditions are improved ☑ Infrastructure is upgraded, protected, and maintained						
Water quality treatment Improvement in the LOMC campus design	Problems Solved	Inadequate space for storm water equipment and storage. Inefficient design for storm water operations.	N/A	☐ Will the project educate public about storm water? ☐ Will the project provide an opportunity for stewardship activities?	☐ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?	Define a water quality treatment improvement project that ties into SWPPP at LOMC. Jared to propose new scope.	$60,000.00	9
	Benefits	☐ Flooding is reduced ☐ Water quality is improved ☐ Aquatic Habitat conditions are improved ☐ Infrastructure is upgraded, protected, and maintained						
Stormwater Infrastructure Management Plan	Problems Solved		High	☐ Will the project educate public about storm water? ☐ Will the project provide an opportunity for stewardship activities?	☐ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?	Ties into cartograph and asset management	$200,000.00	1
	Benefits	☑ Flooding is reduced ☑ Water quality is improved ☑ Aquatic Habitat conditions are improved ☑ Infrastructure is upgraded, protected, and maintained						

Project Priority Matrix

Project Name	Primary Criteria		P.C. Score	Secondary Criteria		Remarks	Cost Estimate	Rank
				Public Participation	Comp. Planning , Admin., and Funding			
Annual System Rehabilitation and Replacement	Problems		**Medium-High**	☐ Will the project educate public about storm water?	☐ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?		$100,000.00	5
	Benefits	☑ Flooding is reduced ☑ Water quality is improved ☐ Aquatic Habitat conditions are improved ☑ Infrastructure is upgraded, protected, and maintained		☐ Will the project provide an opportunity for stewardship activities?				
Funding for Strategic Opportunities to Improve the Stormwater Management Program	Problems Solved		**N/A**	☐ Will the project educate public about storm water?	☐ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?	It's more a budget issue. Since this doesn't categorize as a project and it's just funding, practically we can't associate any risk or priorities to it. We would like its estimated to be revised and probably higher than 100k.	$100,000.00	10
	Benefits	☑ Flooding is reduced ☑ Water quality is improved ☑ Aquatic Habitat conditions are improved ☑ Infrastructure is upgraded, protected, and maintained		☐ Will the project provide an opportunity for stewardship activities?				
44th Avenue Flood Notification Signage	Problems Solved	Hazards for motorists	**Medium-High**	☑ Will the project educate public about storm water?	☑ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☐ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☐ - Do we understand the problem well enough to design and implement an effective solution?	There are benefits to the community, if we were to do the next project sooner, then this project wouldn't be needed as much, but since 44th raising is not foreseen within the next few years, we would like to get this done.	$180,000.00	4
	Benefits	☐ Flooding is reduced ☐ Water quality is improved ☐ Aquatic Habitat conditions are improved ☐ Infrastructure is upgraded, protected, and maintained		☑ Will the project provide an opportunity for stewardship activities?				
44th Avenue W. Roadway Faising at Scriber Creek Crossing (Phase 2)	Problems Solved		**High**	☐ Will the project educate public about storm water?	☑ - Are there other project benefits to the community? ☐ - Will the project enhance social equity? ☐ - Can the project be scheduled to coincide with other city projects such that the total cost is reduced? ☑ - Is the project a candidate for outside grant funding that will magnify the benefits of utility fund? ☑ - Do we understand the problem well enough to design and implement an effective solution?	Requires an out-side-this-mix-approach as a stand-alone project	$14,000,000.00	3
	Benefits	☑ Flooding is reduced ☐ Water quality is improved ☑ Aquatic Habitat conditions are improved ☑ Infrastructure is upgraded, protected, and maintained		☐ Will the project provide an opportunity for stewardship activities?				

APPENDIX G

Capital Improvement Program Summary Sheets

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Remove Diversion Structure and Oil/Water Separator downstream of 196th Street SW

Project Number: 2 Estimated Cost: $350,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The existing diversion vault located immediately downstream of the 196th Street SW culvert crossing is not working properly and also backs up flow into and upstream of the Scriber Creek culverts. In addition, the connected oil/water separator does not function well and, unless it is frequently maintained, has the potential to release accumulated oils during significant precipitation events.

PROJECT DESCRIPTION

Remove the diversion structure downstream of 196th Street SW that currently backs up water for an ineffective oil/water separator and incorporate necessary fish passage improvements to the existing 196th Street SW culverts, such as a fish passage weir or boulder riffle, to provide minimum water depths for fish passage and channel bed stability downstream of the culverts. Remove the oil/water separator downstream of 196th Street SW and replace it with an alternative stormwater treatment type that meets current stormwater regulations and code requirements.

BENEFITS OF PROJECT

Removing the downstream diversion structure helps to lower upstream water levels. Although this would require a new weir or boulder riffle to be installed in Scriber Creek downstream of the existing culverts to maintain a fish passage through the culverts, the removal of the diversion structure still results in significantly lower upstream water levels.

Looking upstream to diversion weir and vault during summer baseflows.

November 23, 2011 flooding at the diversion weir.

FEASIBILITY CONSIDERATIONS

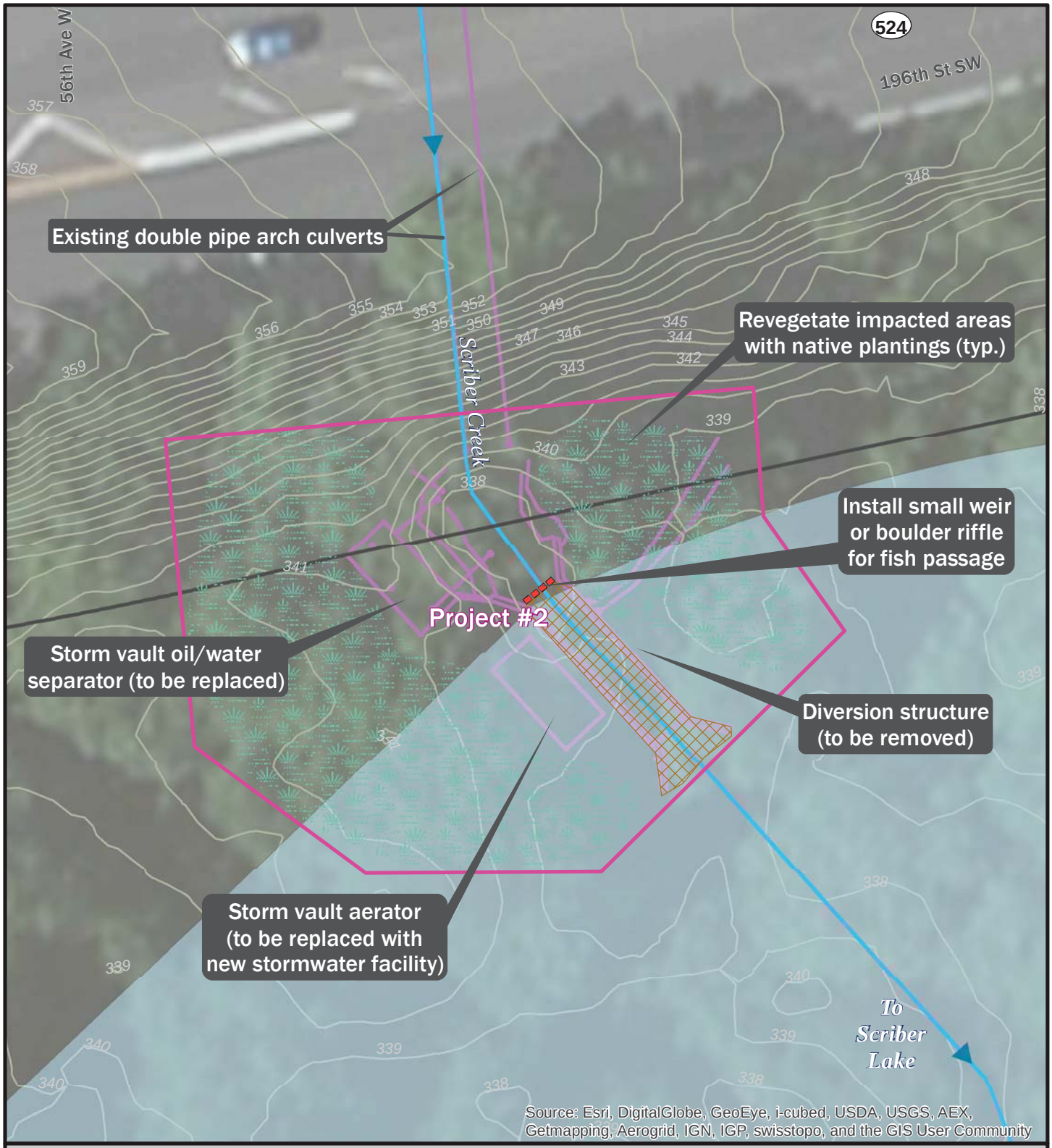
- Park access and trail detours will be required during construction.
- Streamflow diversion and/or a flow bypass pipe/pumping likely needed.
- Instream grade control (per WDFW guidance, either small weir, or boulder riffle) needed to replace existing function of diversion weir to provide adequate water depth for fish passage.
- Coordination with City of Lynnwood Parks Department would be needed.
- Stormwater quality design for replacement treatment facility needed.

PERMITS REQUIRED

- CWA Section 404 (USACE, NWP 3 - Maintenance)
- CWA Section 401 (Ecology, Certified through NWP 3)
- Hydraulic Project Approval (WDFW)
- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with mitigation (Lynnwood)

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- City of Lynnwood In-Lieu Fee Stormwater Program
- Salmon Recovery Funding Board (SRFB) Grant, Washington State Recreation and Conservation Office (RCO)
- Centennial Grant, Washington State Department of Ecology
- Water Quality: Section 319 Grant, Ecology
- Stormwater Financial Assistance, Ecology
- Washington Wildlife and Recreation Program (WWRP), RCO
- Land and Water Conservation Fund (LWCF), RCO
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)
- Cooperative Watershed Management Grant, WRIA 8 Salmon Recovery Council
- Aquatic Lands Enhancement Account (ALEA) Volunteer Cooperative Grant Program, WDFW



Legend

- Proposed project area
- Parcel
- Scriber Creek
- Revegetation (typ.)
- Boulder riffle
- Proposed weir
- Existing 1-ft contour
- Surveyed line
- Snohomish County wetland

Project #2 - Remove Diversion Structure and Oil/Water Separator Downstream of 196th Street and Incorporate Fish Passage Improvements.

N

0 12.5 25 50 Feet

LYNNWOOD WASHINGTON

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #2: Remove Diversion Structure.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$12,000	$12,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$11,000	$11,000	
1-05.4	SURVEYING	1	LS	$20,000	$20,000	
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.15	ACRE	$10,000	$1,500	
2-02.5	REMOVAL OF STRUCTURE AND OBSTRUCTION	1	LS	$5,000	$5,000	Includes removal and disposal
2-09.5	STRUCTURE EXCAVATION CLASS B INCL. HAUL	150	CY	$30	$4,500	assumed dimenisions 20'x40'x5', costs based on Lynnwood 53rd Ave - winning bid
SPECIAL	NEW OIL/WATER SEPARATOR STRUCTURE	1	LS	$25,000	$25,000	To be designed
SPECIAL	CHANNEL GRADE CONTROL FOR FISH PASSAGE	1	LS	$5,000	$5,000	installation of small weir or boulder riffle for fish passage - cost covers either approximately two channel-spanning log structures or one 60ft long 3ft-deep boulder riffle
9-03.11	STREAMBED SEDIMENT	58	TN	$40	$2,320	amend with gravel to restore disturbed streambed
8-02.3	PSIPE - 1 GAL PLANTS - RIPARIAN PLANTINGS	100	EA	$10.00	$1,000	4' spacing on center, includes establishment
8-02.3	WET NATIVE SEEDING AND MULCHING	0.15	ACRE	$9,000	$1,350	Lynnwood 53rd Ave - winning bid
SPECIAL	STREAMFLOW DIVERSION / FLOW BYPASS	1	LS	$15,000	$15,000	
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$20,000	$20,000	
1-05.18	RECORD DRAWINGS	1	LS	$5,000	$5,000	
SUBTOTAL CONSTRUCTION COST					$129,670	
SALES TAX				9.8%	$12,710	
TOTAL CONSTRUCTION COST WITH TAX					**$142,400**	
OTHER APPROXIMATED PROJECT COSTS						
DESIGN				25%	$35,600	
ENVIRONMENTAL PERMITTING				30%	$40,000	Includes costs of all technical evaluation, preparing supporting documentation including mitigation plan, and submitting the permit applications
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$22,000	
SPECIAL TESTING AND INSPECTIONS				5%	$8,000	
SUBTOTAL PROJECT COSTS					$248,000	
PROJECT CONTINGENCY				30%	$75,000	
			TOTAL ESTIMATED PROJECT COST:		**$320,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #2: Remove Diversion Structure.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	8	TIMES/YEAR	$315	$2,520	frequency based on O&M table NPDES Phase II (2008)
	MOWING OR VEGETATION MAINTENANCE	2	TIMES/YEAR	$50	$100	Maintain plantings
	CLEAN NEW OIL/WATER SEPARATOR FACILITY	2	TIMES/YEAR	$350	$700	WQ facility - depending on design
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$3,320**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Raise Old 196th Street SW

Project Number: 4

Estimated Cost: $490,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The Old 196th Street SW roadway is lower in elevation than high water levels and is expected to flood even if other adjacent conveyance improvements were made. The driveways and parking lots upstream and adjacent to Old 196th Street experience flooding during flows more frequent than the 10-year recurrence event, cutting off access to businesses.

PROJECT DESCRIPTION

Raise the low portions of Old 196th Street roadway about 1 foot to elevation 342 ft (NAVD 88 vertical datum) starting near the west end of the bridge that provides pedestrian access to Wilcox Park. This project would also raise the access driveways for the Great Floors and Parkview Plaza buildings to meet the new elevation of Old 196th Street.

BENEFITS OF PROJECT

Raising the roadway would improve access to Parkview Plaza and provide protection from roadway overtopping during the 100-year event, and improved public safety.

December 4, 2007, Flooding of Old 196th looking east

December 4, 2007 Flooding of Old 196th looking west.

FEASIBILITY CONSIDERATIONS

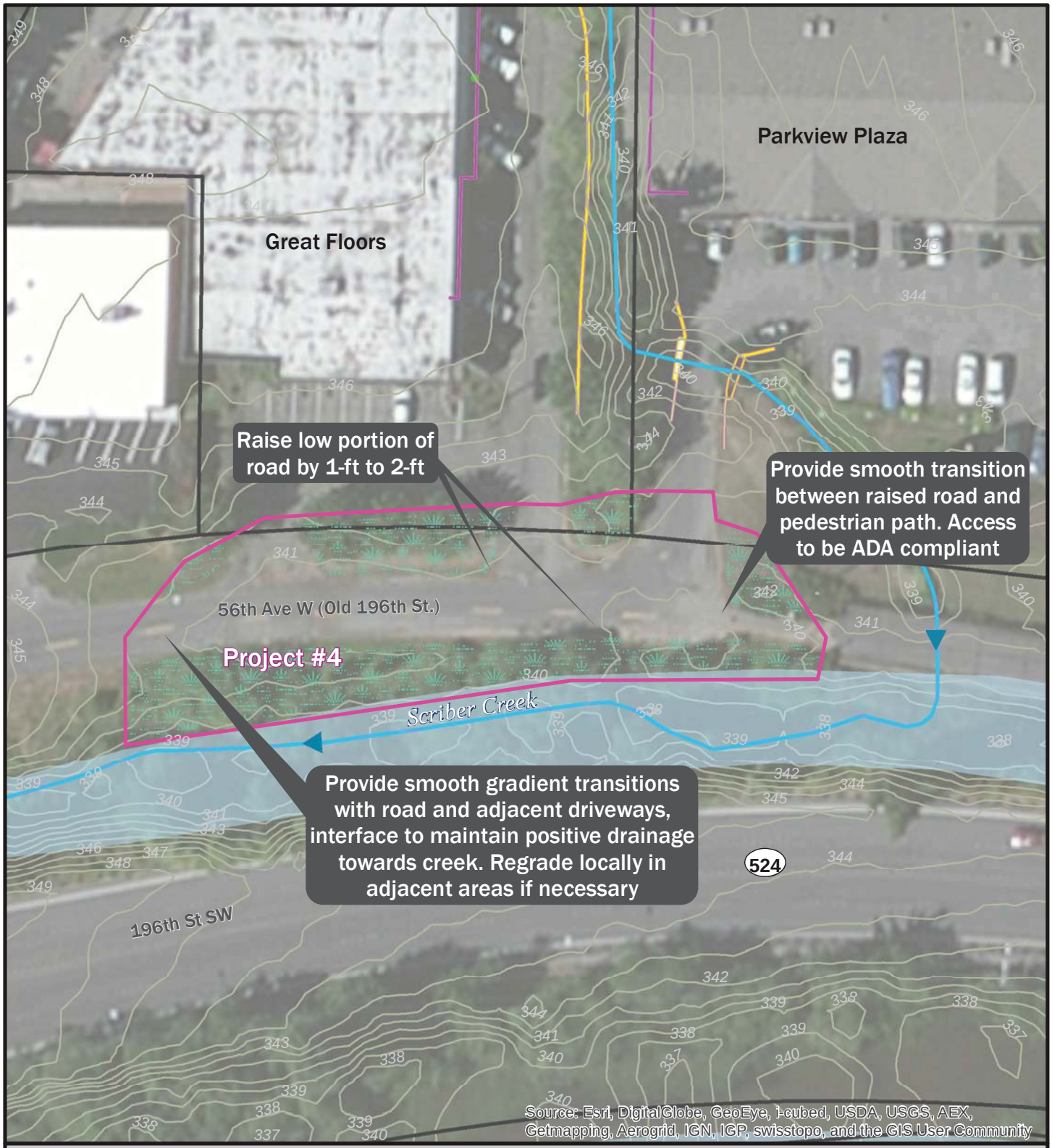
- Coordination with business owners, possibly including time for developing a cost-sharing agreement will be required.
- Need to provide access to businesses during construction.
- Geotechnical analyses needed to assess settling concerns due to additional weight of raised roadway. Overbuilding the road, using lightweight fill, or preloading the roadway may be required.
- Project assumes direct impacts to Scriber Creek buffer but not below the ordinary high water of the creek.
- If raising grade requires grade transitions on private property, temporary construction easements would be required.
- Short retaining wall and guardrail may be required on south side to limit fill within stream buffer.

PERMITS REQUIRED

- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Lynnwood CA Permit with buffer mitigation

POTENTIAL FUNDING SOURCES

- Cost-sharing program with private property owners
- City of Lynnwood Surface Water Utility Fund
- City of Lynnwood In-Lieu Fee Stormwater Program
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)



Legend

- Proposed project area
- Scriber Creek
- Revegetation (typ.)
- Existing 1-ft contour
- Surveyed line
- Snohomish County wetland
- Parcel

Project # 4 - Raise Old 196th Street.

N

0 25 50 100 Feet

LYNNWOOD WASHINGTON

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #4: Raise Old 196th Street.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$19,000	$19,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$17,000	$17,000	Assume access to businesses maintained during construction
1-05.4	SURVEYING	1	LS	$10,000	$10,000	
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.1	ACRE	$10,000	$1,000	
2-02.5	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$2,000	$2,000	removal of curb
2-02.5	REMOVAL OF ASPHALT CONC PAVEMENT	1380	SY	$18	$24,840	
2-03.5	GRAVEL BORROW INCL HAUL	600	CY	$30	$18,000	Assumes using gravel borrow to raise lower portions of roadway an average of 1.33ft in places
2-03.5	EMBANKMENT COMPACTION	600	CY	$4	$2,400	
4-04.5	CRUSHED SURFACING TOP COURSE	280	TON	$35	$9,800	Assumes 4IN depth, 1.85 TON/CY compacted dry on roadway
5-04.5	HMA PG 64-22	310	TON	$110	$34,100	Assumes 4IN depth, 2.05 TON/CY installed on roadway
5-04.5	PAVEMENT GEOTEXTILE (PETROMAT)	1380	SY	$3	$4,140	
SPECIAL	WALL-CONCRETE (VARYING HEIGHT)	150	LF	$150	$22,500	(assumed on south side so don't expand into buffer and also require stormwater quality mitigation by new pavement)
8-02.3	PSIPE - 1 GAL PLANTS - RIPARIAN PLANTINGS	50	EA	$10.00	$500	native plantings for adjacent riparian areas; 4' spacing on center, includes establishment
8-02.5	SEEDING AND MULCHING	0.1	ACRE	$10,000	$1,000	
8-02.6	LANDSCAPE RESTORATION	1.0	LS	$4,000	$4,000	to restore landscaped areas to pre-construction conditions
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$15,000	$15,000	upland BMPs to prevent erosion and sedimentation
SPECIAL	UTIILITY ADJUSTMENTS	1	LS	$5,000	$5,000	assumes two storm adjustments and two water valve adjustments; raise hydrant
8-11.5	GUARDRAIL	150	LF	$35	$5,250	assumed south side of road for portion of length
1-05.18	RECORD DRAWINGS	1	LS	$5,000	$5,000	
SUBTOTAL CONSTRUCTION COST					$201,530	
SALES TAX				9.8%	$19,750	
TOTAL CONSTRUCTION COST WITH TAX					**$221,300**	
OTHER APPROXIMATED PROJECT COSTS						
ADMINISTRATIVE COSTS FOR COST-SHARING APPROACH NEGOTIATION				5%	$12,000	
DESIGN				20%	$45,000	
ENVIRONMENTAL PERMITTING				10%	$23,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$34,000	
TEMPORARY AND PERMANENT EASEMENT NEGOTIATION				5%	$12,000	
SPECIAL TESTING AND INSPECTIONS				5%	$12,000	
SUBTOTAL PROJECT COSTS					$347,300	
PROJECT CONTINGENCY				30%	$105,000	
			TOTAL ESTIMATED PROJECT COST:		**$450,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #4: Raise Old 196th Street.

PROJECT LIFE CYCLE	10 YEARS				shorter project life cycle assuming setting and sedimentation
Maintenance Activity Type	**Frequency**	**Unit**	**Unit Cost/Time**	**Annual Amount**	**Assumptions/Notes**
INSPECTION	1	TIMES/YEAR	$315	$315	frequency based on O&M table NPDES Phase II (2008)
MOWING	2	TIMES/YEAR	$50	$100	Maintain plantings
VACTOR TRUCK REMOVAL	1	TIMES/YEAR	$350	$350	Based on historical sediment maintenance data
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS				**$765**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Parkview Plaza Culvert Replacement

Project Number: 5

Estimated Cost: $480,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The Parkview Plaza culvert is undersized. The culvert overtops in the 100-year event and contributes to flooding at Old 196th Street. The backwater created by this undersized culvert encourages Scriber Creek to jump its banks and flood Old 196th Street.

PROJECT DESCRIPTION

Replace driveway and culvert to Parkview Plaza (Lighthouse Diving Center) by replacing the existing 60-inch diameter culvert with a 12.5-ft wide by 5.5-ft high concrete box culvert, and by raising the bank on the west side of the culvert.

BENEFITS OF PROJECT

Provides protection to Parkview Plaza access from overtopping for the 100-year event. This also helps reduce the frequency of flooding at Old 196th Street.

December 4, 2007 Flooding downstream of Parkview Plaza

Looking upstream to existing driveway culvert crossing for Parkview Plaza.

FEASIBILITY CONSIDERATIONS

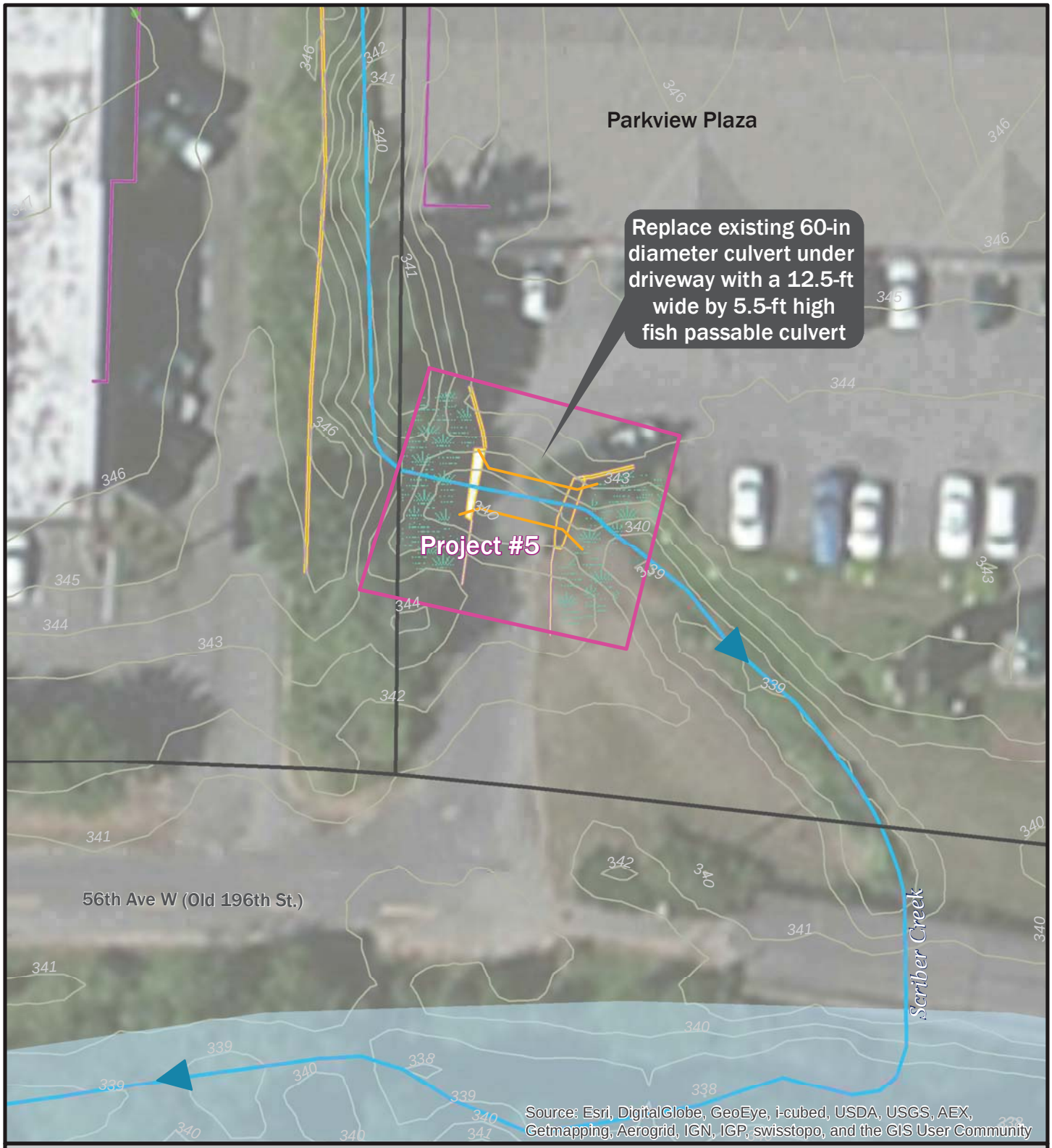
- Project is located on private property; coordination with private business owners, including time for developing a cost-sharing agreement will be required.
- Need to provide access to businesses during construction.
- Streamflow diversion or flow bypass pipe/pumping likely required.
- Additional survey needed to evaluate possible impacts to the private stormwater treatment system serving Great Floors.
- Potential alternative to culvert replacement would be raising the road and berm around the south and west sides of the creek in conjunction with Project 4 to prevent roadway overtopping.

PERMITS REQUIRED

- CWA Section 404 (USACE, NWP 3 - Maintenance)
- CWA Section 401 (Ecology, Certified through NWP 3)
- Hydraulic Project Approval (WDFW)
- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with mitigation (Lynnwood)

POTENTIAL FUNDING SOURCES

- Cost-sharing program with private property owners
- City of Lynnwood Surface Water Utility Fund
- City of Lynnwood In-Lieu Fee Stormwater Program
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)
- Salmon Recovery Funding Board (SRFB) Grant, Washington State Recreation and Conservation Office (RCO)
- Cooperative Watershed Management Grant, WRIA 8 Salmon Recovery Council



Legend

- Proposed project area
- Scriber Creek
- Revegetation (typ.)
- Proposed culvert
- Existing 1-ft contour
- Surveyed line
- Snohomish County wetland
- Parcel

Project # 5 - Culvert Replacement at Driveway to Parkview Plaza.

N

0 15 30 60 Feet

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #5: Parkview Plaza Culvert Replacement and Berm.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$15,000	$15,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$14,000	$14,000	Assume access to businesses maintained during construction
1-05.4	SURVEYING	1	LS	$8,000	$8,000	Cost includes surveying entire site
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.1	ACRE	$10,000	$1,000	
2-02.5	REMOVAL OF ASPHALT CONC PAVEMENT	50	SY	$18	$900	
2-09.5	STRUCTURE EXCAVATION	270	CY	$30	$8,100	
2-09.5	SHORING	600	SF	$5	$3,000	
SPECIAL	12.5'WX5.5'H CONC BOX CULVERT	1	LS	$50,000	$50,000	24' Long, delivered to Lynnwood+ 50% Labor, 13' W
SPECIAL	WING WALLS FOR ENTRANCE PROTECTION	1	LS	$18,150	$18,150	
4-04.5	CRUSED SURFACING TOP COURSE	40	TON	$35	$1,400	1' below culvert and 4" above culvert
9-03.11	STREAMBED SEDIMENT	40	TON	$40	$1,600	
2-03.5	GRAVEL BORROW INCL HAUL	200	CY	$30	$6,000	
5-04.5	HMA PG 64-22	11	TON	$110	$1,210	
SPECIAL	UTILITY ADJUSTMENTS	1	LS	$2,000	$2,000	
8-02.5	SEEDING AND MULCHING	0.1	ACRE	$10,000	$1,000	
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$10,000	$10,000	
SPECIAL	STREAMFLOW DIVERSION / FLOW BYPASS	1	LS	$15,000	$15,000	
1-05.18	RECORD DRAWINGS	1	LS	$5,000	$5,000	
SUBTOTAL CONSTRUCTION COST					$162,360	
SALES TAX				9.8%	$15,920	
TOTAL CONSTRUCTION COST WITH TAX					**$178,300**	
OTHER APPROXIMATED PROJECT COSTS						
ADMINISTRATIVE COSTS FOR COST-SHARING APPROACH NEGOTIATION				10%	$18,000	
DESIGN				30%	$54,000	
ENVIRONMENTAL PERMITTING				30%	$54,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$27,000	
TEMPORARY AND PERMANENT EASEMENT NEGOTIATION				10%	$18,000	
SPECIAL TESTING AND INSPECTIONS				5%	$9,000	
SUBTOTAL PROJECT COSTS					$340,300	
PROJECT CONTINGENCY				30%	$103,000	
			TOTAL ESTIMATED PROJECT COST:		**$440,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #5: Parkview Plaza Culvert Replacement and Berm.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	2	TIMES/YEAR	$315	$630	frequency based on O&M table NPDES Phase II (2008)
	MOWING	2	TIMES/YEAR	$50	$100	Maintain plantings
	VACTOR TRUCK REMOVAL	1	TIMES/YEAR	$350	$350	Based on historical sediment maintenance data
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$1,080**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Scriber Creek Culvert Replacement at Casa Del Rey Condominiums Driveway

Project Number: 6 Estimated Cost: $680,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The current Scriber Creek crossing at the Casa Del Rey Condominiums consists of twin 42-inch diameter pipes that are concrete at the inlet but transition to corrugated metal (CMP) at the outlet. The inlets and outlets of these culverts are askew from the north-south alignment of the creek, and about half way across the street, they take a sharp approximate 90-degree bend. The result is that there is significant head loss through this crossing and a high risk for sedimentation within and upstream of the culverts. Scriber Creek overtops the driveway in a 100-year recurrence interval flood event, endangering motorists and pedestrians and causing flooding damage to adjacent properties and several condominium residences.

PROJECT DESCRIPTION

Replace the existing combination of angled twin 42-inch diameter concrete and CMP culverts with one flow-aligned 12.5-ft wide by 5.5-ft tall precast 3-sided concrete culvert. The replacement culvert will be partially buried per Washington Department of Fish and Wildlife (WDFW) guidelines for scour resistance and to provide a natural streambed for physical habitat.

BENEFITS OF PROJECT

The replaced culvert provides a 100-year level of protection from flooding, resulting in improved public safety, increased flow conveyance capacity, improved instream habitat, and improved fish passage.

December 3, 2007 overtopping of existing Casa del Rey Culvert.

Looking downstream to inlet of Casa del Rey Culverts.

FEASIBILITY CONSIDERATIONS

- Coordination with private property owners including time for developing a cost-sharing agreement will be required.
- Need to provide access to residences and/or a temporary traffic detour during construction.
- Cut-and-cover construction.
- Streamflow diversion or flow bypass pipe/pumping likely required.
- Bottomless concrete box structure placed on strip footing.
- Geotechnical exploration needed for design.

PERMITS REQUIRED

- CWA Section 404 (USACE, NWP 3 - Maintenance)
- CWA Section 401 (Ecology, Certified through NWP 3)
- Hydraulic Project Approval (WDFW)
- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with mitigation (Lynnwood)

POTENTIAL FUNDING SOURCES

- Cost-sharing program with private property owners
- Salmon Recovery Funding Board
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)
- Salmon Recovery Funding Board (SRFB) Grant, Washington State Recreation and Conservation Office (RCO)
- Cooperative Watershed Management Grant, WRIA 8 Salmon Recovery Council

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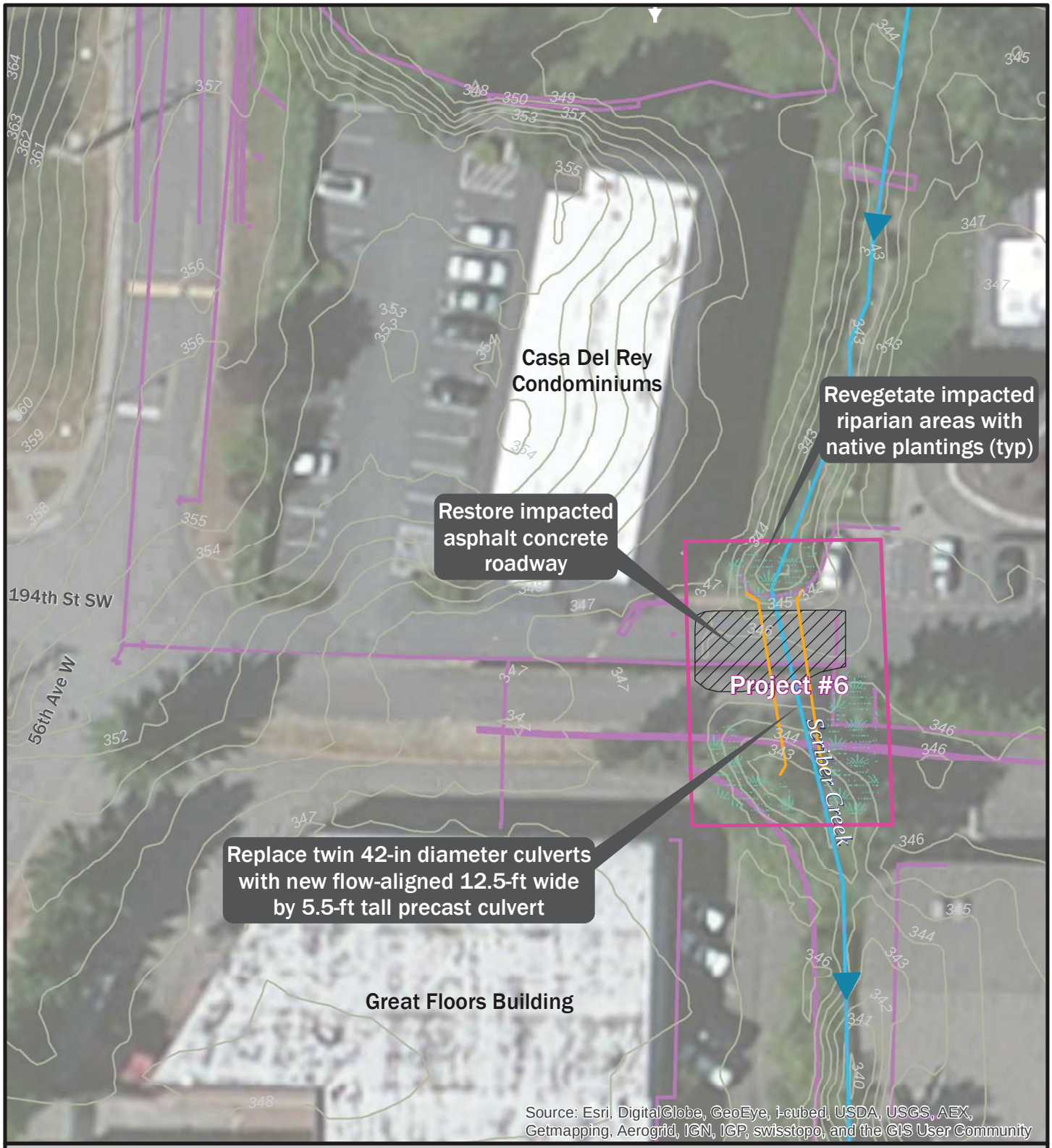

Legend

- Proposed project area
- Scriber Creek
- Revegetation (typ.)
- Proposed culvert
- Proposed asphalt paving
- Existing 1-ft contour
- Surveyed line

Project #6 - Replace Culvert at Casa del Rey.

N

0 20 40 80 Feet

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #6: Replace Casa Del Rey Culvert.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$26,000	$26,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (1	1	LS	$23,000	$23,000	Assume access to residences maintained during construction
1-05.4	SURVEYING	1	LS	$20,000	$20,000	
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.05	ACRE	$10,000	$500	
2-02.5	REMOVE ASPHALT CONC. PAVEMENT	80	SY	$18	$1,440	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid - high number
2-02.5	REMOVAL OF STRUCTURE AND OBSTRUCTIO	1	LS	$3,630	$3,630	comp plan, price adjusted
2-03.5	EMBANKMENT COMPACTION	150	CY	$4	$600	comp plan quantity, unit cost from WSDOT bid tabs/UBA
2-09.5	STRUCTURE EXCAVATION CLASS B INCL. HA	220	CY	$30	$6,600	quantity from comp plan, unit cost from Lynnwood 53rd Ave - winning bid
2-09.5	SHORING OR EXTRA EXCAVATION CLASS B	588	SY	$5	$2,940	quantity from comp plan, unit cost from Lynnwood 53rd Ave - winning bid
2-12.5	CONSTRUCTION GEOTEXTILE FOR SOIL STAI	500	SY	$4	$2,000	comp plan quantity, cost WSDOT bid tabs/UBA
SPECIAL	12' W x 5.5' H CONCRETE BOX CULVERT STRU	1	EA	$60,000	$60,000	50' length; cost from OldCastle incl. delivery
SPECIAL	FOUNDATION PREPARATION	1	LS	$12,100	$12,100	comp plan, price adjusted
SPECIAL	WING WALLS FOR ENTRANCE PROTECTION	1	LS	$18,150	$18,150	comp plan, price adjusted
SPECIAL	CULVERT INSTALLATION	1	LS	$36,300	$36,300	comp plan, price adjusted
4-04.5	CRUSHED SURFACING TOP COURSE	20	TN	$35	$700	9 CY from comp plan, unit cost from Lynnwood 53rd Ave - winning bid
5-04.5	HMA CL. 1/2 IN. PG	25	TN	$110	$2,750	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid - high number
9-03.11	STREAMBED SEDIMENT	58	TN	$40	$2,320	27 CY from comp plan, unit cost from Parr and East
8-02.3	PSIPE - 1 GAL PLANTS - RIPARIAN PLANTINGS	600	EA	$10.00	$6,000	4' spacing on center, includes establishment
SPECIAL	CHAIN LINK FENCE REMOVAL AND REPLACEI	1	LS	$4,840	$4,840	comp plan, price adjusted
8-02.3	WET NATIVE SEEDING AND MULCHING	0.05	ACRE	$9,000	$450	Lynnwood 53rd Ave - winning bid
SPECIAL	STREAMFLOW DIVERSION / FLOW BYPASS	1	LS	$15,000	$15,000	
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$20,000	$20,000	
	BACKFILL FOR STRUCTURAL EARTH WALL IN	150	CY	$50	$7,500	
1-05.18	RECORD DRAWINGS	1	LS	$5,000	$5,000	
SUBTOTAL CONSTRUCTION COST					$278,820	
SALES TAX				9.8%	$27,330	
TOTAL CONSTRUCTION COST WITH TAX					**$306,100**	
OTHER APPROXIMATED PROJECT COSTS						
ADMINISTRATIVE COSTS FOR COST-SHARING APPROACH NEGOTIATION				5%	$16,000	
DESIGN				20%	$62,000	
ENVIRONMENTAL PERMITTING					$40,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$46,000	
TEMPORARY AND PERMANENT EASEMENT NEGOTIATION				5%	$16,000	
SPECIAL TESTING AND INSPECTIONS				5%	$16,000	
SUBTOTAL PROJECT COSTS					$486,100	
PROJECT CONTINGENCY				30%	$146,000	
			TOTAL ESTIMATED PROJECT COST:		**$630,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #6: Replace Casa Del Rey Culvert.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	2	TIMES/YEAR	$315	$630	On private property. O&M not City's responsibility. Cost estimates provided for planning and reference purposes only.
	MOWING	2	TIMES/YEAR	$50	$100	Maintain plantings
	VACTOR TRUCK REMOVAL	0.5	TIMES/YEAR	$350	$175	Based on historical sediment maintenance data
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$905**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Replace 191st Street SW Culvert

Project Number: 9a

Estimated Cost: $550,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

Scriber Creek overtops 191st Street SW in a 20-year recurrence interval flood event, disrupting traffic, endangering motorists and pedestrians, and causing flooding damage to adjacent properties. This culvert also contributes to flooding of the roadway and single family residences at 190th Street SW.

PROJECT DESCRIPTION

Replace the existing 42-ft long 48-inch diameter culvert with new fish passable 8-ft wide by 5.5-ft high culvert counter sunk per Washington Department of Fish and Wildlife (WDFW) guidelines for scour resistance and to provide a natural streambed for physical habitat.

BENEFITS OF PROJECT

Replacing the culvert is expected to lower the Scriber Creek water levels to reduce overbank flooding and roadway flooding. This would Improve public safety, increase flow conveyance capacity, improve instream habitat, and improve fish passage.

Looking upstream to existing channel and culvert inlet at 191st ST SW.

Looking downstream to existing culvert inlet at 191st ST SW.

FEASIBILITY CONSIDERATIONS

- Cut-and-cover construction.
- Temporary traffic detour during installation.
- Streamflow diversion and/or a flow bypass pipe/pumping likely needed.
- Bottomless concrete box structure placed on strip footing.
- Geotechnical exploration needed for design.
- Instream grade controls needed on downstream side to raise water surface profile through culvert.

PERMITS REQUIRED

- CWA Section 404 (USACE, NWP 3 - Maintenance)
- CWA Section 401 (Ecology, Certified through NWP 3)
- Hydraulic Project Approval (WDFW)
- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with mitigation (Lynnwood)

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- City of Lynnwood In-Lieu Fee Stormwater Program
- Salmon Recovery Funding Board (SRFB) Grant, Washington State Recreation and Conservation Office (RCO)
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)
- Cooperative Watershed Management Grant, WRIA 8 Salmon Recovery Council

LYNNWOOD WASHINGTON

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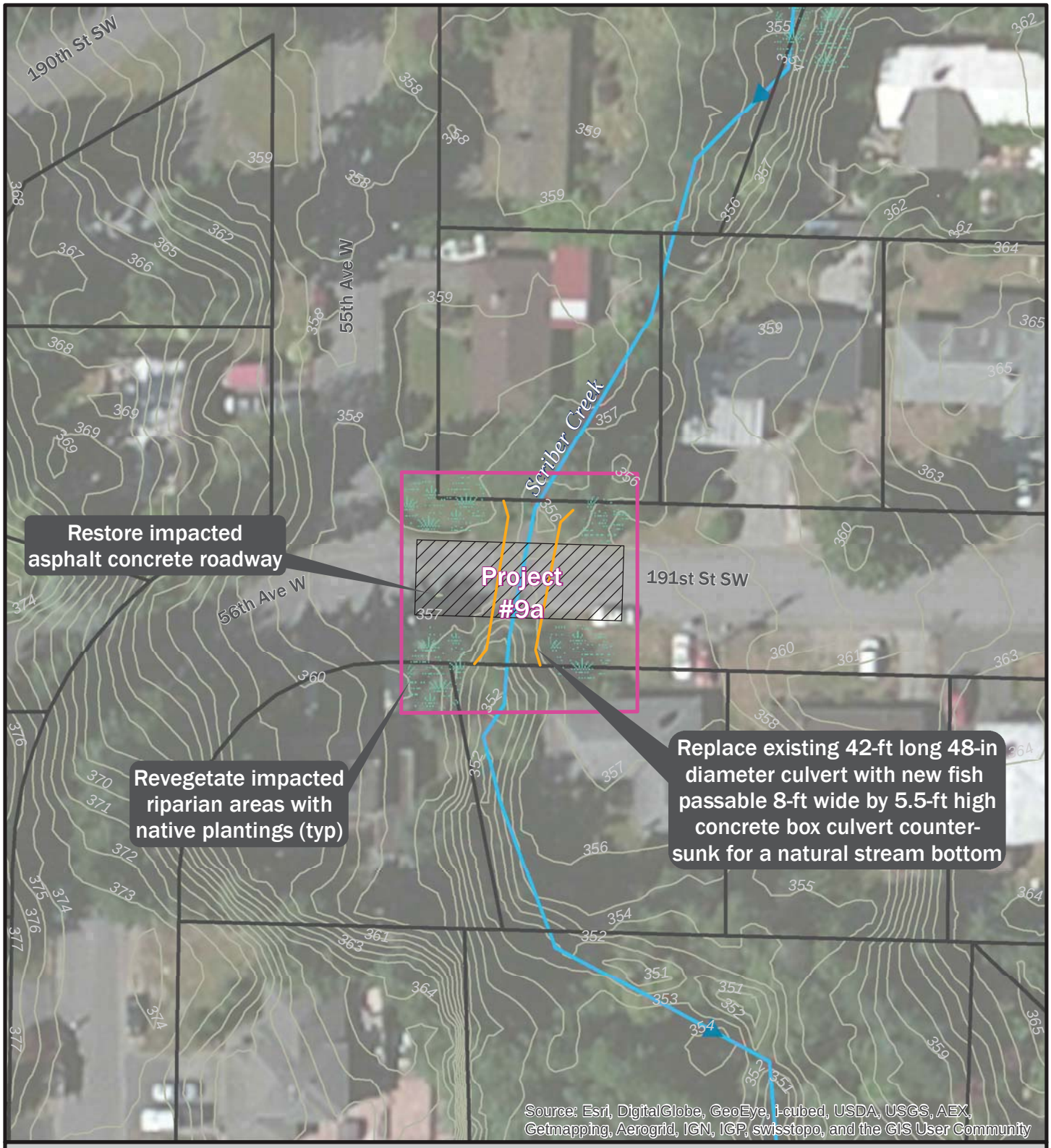

Legend

- Proposed project area
- Scriber Creek
- Revegetation (typ.)
- Proposed culvert
- Proposed asphalt paving
- Existing 1-ft contour
- Parcel

Project #9a - Replace 191st Street SW Culvert.

N

0 25 50 100 Feet

LYNNWOOD WASHINGTON

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #9a: Replace 191st Street Culvert.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$20,000	$20,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$19,000	$19,000	
1-05.4	SURVEYING	1	LS	$20,000	$20,000	Cost includes surveying entire project site and utility locates
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.05	ACRE	$10,000	$500	
2-02.5	REMOVE ASPHALT CONC. PAVEMENT	60	SY	$18	$1,080	comp plan quanitity, cost from WSDOT bid tabs for smaller project areas
2-02.5	REMOVAL OF STRUCTURE AND OBSTRUCTION	1	LS	$2,420	$2,420	comp plan, price adjusted
2-09.5	STRUCTURE EXCAVATION CLASS B INCL. HAUL	160	CY	$30	$4,800	comp plan quanitity, unit cost from Lynnwood 53rd Ave - winning bid
2-09.5	SHORING OR EXTRA EXCAVATION CLASS B	630	SY	$5	$3,150	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid
SPECIAL	8' W x 5.5' H CONCRETE BOX CULVERT STRUCTURE	1	EA	$29,400	$29,400	42' length; price from OldCastle incl delivery
SPECIAL	FOUNDATION PREPARATION	1	LS	$9,680	$9,680	comp plan, price adjusted
SPECIAL	WING WALLS FOR ENTRANCE PROTECTION	1	LS	$18,150	$18,150	comp plan, price adjusted
SPECIAL	CULVERT INSTALLATION	1	LS	$30,250	$30,250	comp plan, price adjusted
SPECIAL	CHANNEL GRADE CONTROL STRUCTURES	1	LS	$6,050	$6,050	comp plan, price adjusted
4-04.5	CRUSHED SURFACING TOP COURSE	13	TN	$35	$455	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid
5-04.5	HMA CL. 1/2 IN. PG	17	TN	$110	$1,870	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid - high number
9-03.11	STREAMBED SEDIMENT	39	TN	$40	$1,560	comp plan quanitity, unit cost from Parr and East
8-02.3	PSIPE - 1 GAL PLANTS - RIPARIAN PLANTINGS	650	EA	$10.00	$6,500	4' spacing on center, includes establishment
SPECIAL	GUARD RAIL REMOVAL AND REPLACEMENT	1	LS	$3,630	$3,630	comp plan, price adjusted
8-02.3	WET NATIVE SEEDING AND MULCHING	0.05	ACRE	$9,000	$450	Lynnwood 53rd Ave - winning bid
SPECIAL	STREAMFLOW DIVERSION / FLOW BYPASS	1	LS	$15,000	$15,000	
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$20,000	$20,000	
1-05.18	RECORD DRAWINGS	1	LS	$5,000	$5,000	
SUBTOTAL CONSTRUCTION COST					$219,945	
SALES TAX				9.8%	$21,560	
TOTAL CONSTRUCTION COST WITH TAX					**$241,500**	
OTHER APPROXIMATED PROJECT COSTS						
DESIGN				20%	$49,000	
ENVIRONMENTAL PERMITTING					$40,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications; permitting costs could be significantly reduced if bundled with other adjacent culvert projects
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$37,000	
TEMPORARY AND PERMANENT EASEMENT NEGOTIATION				5%	$13,000	
SPECIAL TESTING AND INSPECTIONS				5%	$13,000	
SUBTOTAL PROJECT COSTS					$393,500	
PROJECT CONTINGENCY				30%	$119,000	
		TOTAL ESTIMATED PROJECT COST:			**$510,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #9a: Replace 191st Street Culvert.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	2	TIMES/YEAR	$315	$630	frequency based on O&M table NPDES Phase II (2008)
	MOWING	2	TIMES/YEAR	$50	$100	Maintain plantings
	VACTOR TRUCK REMOVAL	0.5	TIMES/YEAR	$350	$175	Based on historical sediment maintenance data
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$905**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Replace 190th Street SW Culvert

Project Number: 9b

Estimated Cost: $710,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

Scriber Creek overtops 190th Street SW in a 10-year recurrence interval flood event, disrupting traffic, endangering motorists and pedestrians, and causing flooding damage to adjacent properties.

PROJECT DESCRIPTION

Replace the existing 46-ft long 6-ft wide by 4-ft high box culvert with new fish passable 12-ft wide by 5.5-ft high culvert counter sunk per Washington Department of Fish and Wildlife (WDFW) guidelines for scour resistance and to provide a natural streambed for physical habitat.

BENEFITS OF PROJECT

Replacing the culvert is expected to lower the Scriber Creek water levels to reduce overbank flooding and roadway flooding. This would Improve public safety, increase flow conveyance capacity, improve instream habitat, and improve fish passage.

November 23, 2011 flooding of 190th St SW, looking east.

November 23, 2011 flooding of 190th St SW, looking west.

FEASIBILITY CONSIDERATIONS

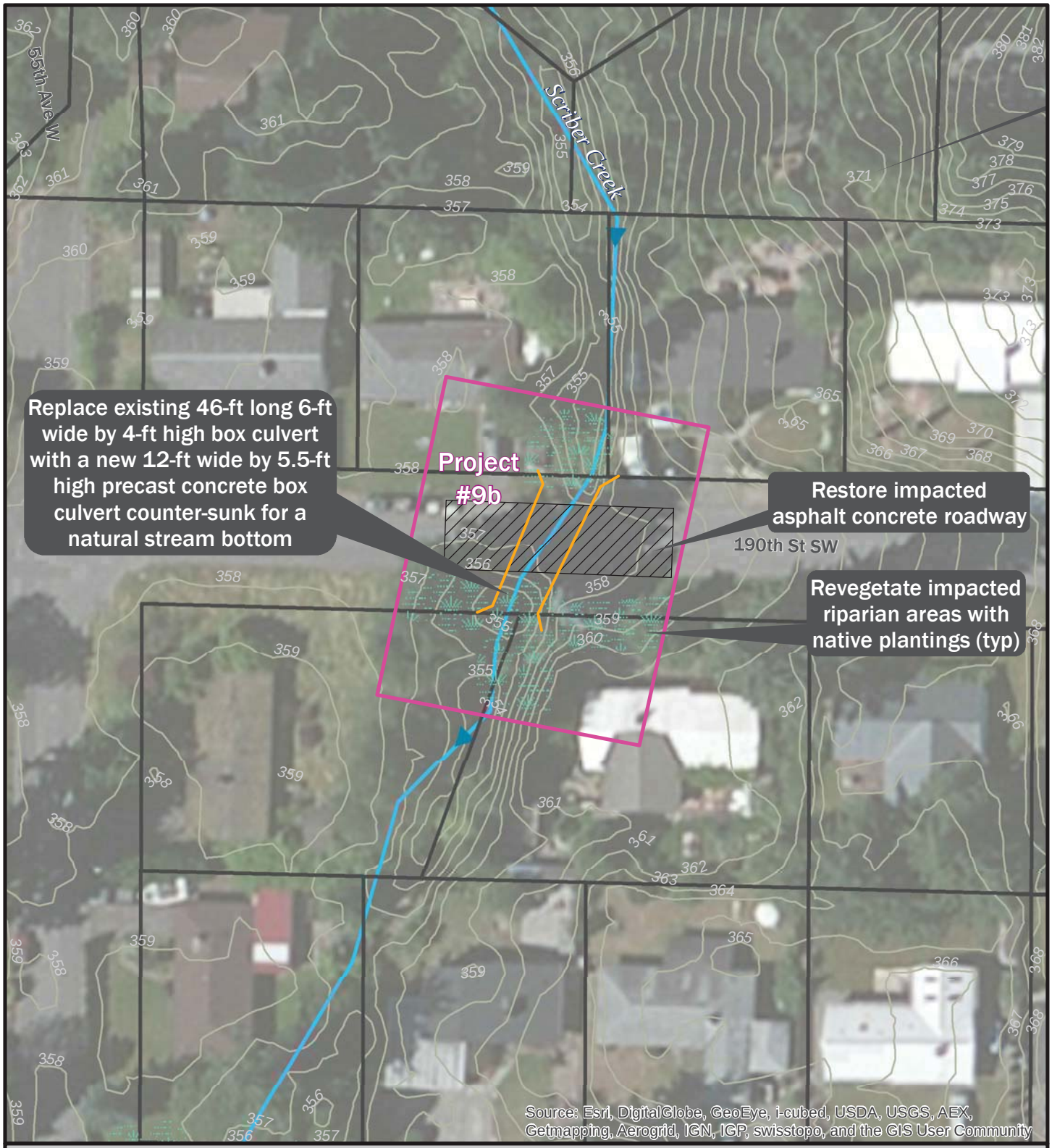
- Cut-and-cover construction.
- Temporary traffic detour during installation.
- Streamflow diversion and/or a flow bypass pipe/pumping likely needed.
- Bottomless concrete box structure placed on strip footing.
- Geotechnical exploration needed for design.
- Instream grade controls needed on downstream side to raise water surface profile through culvert.

PERMITS REQUIRED

- CWA Section 404 (USACE, NWP 3 - Maintenance)
- CWA Section 401 (Ecology, Certified through NWP 3)
- Hydraulic Project Approval (WDFW)
- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with mitigation (Lynnwood)

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- City of Lynnwood In-Lieu Fee Stormwater Program
- Salmon Recovery Funding Board (SRFB) Grant, Washington State Recreation and Conservation Office (RCO)
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)
- Cooperative Watershed Management Grant, WRIA 8 Salmon Recovery Council



Legend

- Proposed project area
- Scriber Creek
- Revegetation (typ.)
- Proposed culvert
- Proposed asphalt paving
- Existing 1-ft contour
- Parcel

Project #9b - Replace 190th Street SW Culvert.

N

0 25 50 100 Feet

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #9b: Replace 190th Street Culvert.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$27,000	$27,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$25,000	$25,000	
1-05.4	SURVEYING	1	LS	$20,000	$20,000	Cost includes surveying entire project site and utility locates
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.05	ACRE	$10,000	$500	
2-02.5	REMOVE ASPHALT CONC. PAVEMENT	50	SY	$18	$900	12' +3' width x 30' length
2-02.5	REMOVAL OF STRUCTURE AND OBSTRUCTION	1	LS	$8,470	$8,470	comp plan, pride adjusted, assumes culvert will be salvaged
2-09.5	STRUCTURE EXCAVATION CLASS B INCL. HAUL	180	CY	$30	$5,400	unit cost from Lynnwood 53rd Ave - winning bid
2-09.5	SHORING OR EXTRA EXCAVATION CLASS B	644	SY	$5	$3,220	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid
SPECIAL	12' W x 5.5' H CONCRETE BOX CULVERT STRUCTURE	1	EA	$55,200	$55,200	42' length; price from OldCastle incl delivery
SPECIAL	FOUNDATION PREPARATION	1	LS	$12,000	$12,000	based on similar projects in comp plan
SPECIAL	WING WALLS FOR ENTRANCE PROTECTION	1	LS	$18,150	$18,150	comp plan, price adjusted
SPECIAL	CULVERT INSTALLATION	1	LS	$36,300	$36,300	comp plan, price adjusted
SPECIAL	CHANNEL REGRADING AND GRADE CONTROL STRUCTU	1	LS	$24,200	$24,200	comp plan, price adjusted
4-04.5	CRUSHED SURFACING TOP COURSE	13	TN	$35	$455	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid
5-04.5	HMA CL. 1/2 IN. PG	17	TN	$110	$1,870	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid - high number
9-03.11	STREAMBED SEDIMENT	61	TN	$40	$2,440	comp plan quanitity, unit cost from Parr and East
8-02.3	PSIPE - 1 GAL PLANTS - RIPARIAN PLANTINGS	650	EA	$10.00	$6,500	4' spacing on center, includes establishment
SPECIAL	GUARD RAIL REMOVAL AND REPLACEMENT	1	LS	$3,630	$3,630	comp plan, price adjusted
8-02.3	WET NATIVE SEEDING AND MULCHING	0.05	ACRE	$9,000	$450	Lynnwood 53rd Ave - winning bid
SPECIAL	STREAMFLOW DIVERSION / FLOW BYPASS	1	LS	$15,000	$15,000	
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$20,000	$20,000	
1-05.18	RECORD DRAWINGS	1	LS	$5,000	$5,000	
SUBTOTAL CONSTRUCTION COST					$292,685	
SALES TAX				9.8%	$28,690	
TOTAL CONSTRUCTION COST WITH TAX					**$321,400**	
OTHER APPROXIMATED PROJECT COSTS						
DESIGN				20%	$65,000	
ENVIRONMENTAL PERMITTING					$40,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications; permitting costs could be significantly reduced if bundled with other adjacent culvert projects
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$49,000	
TEMPORARY AND PERMANENT EASEMENT NEGOTIATION				5%	$17,000	
SPECIAL TESTING AND INSPECTIONS				5%	$17,000	
SUBTOTAL PROJECT COSTS					$509,400	
PROJECT CONTINGENCY				30%	$153,000	
			TOTAL ESTIMATED PROJECT COST:		**$660,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #9b: Replace 190th Street Culvert.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	2	TIMES/YEAR	$315	$630	frequency based on O&M table NPDES Phase II (2008)
	MOWING	2	TIMES/YEAR	$50	$100	Maintain plantings
	VACTOR TRUCK REMOVAL	0.5	TIMES/YEAR	$350	$175	Based on historical sediment maintenance data
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$905**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Replace 189th Street SW Culvert

Project Number: 9c

Estimated Cost: $600,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

Scriber Creek overtops 189th Street SW in a 10-year recurrence interval flood event, disrupting traffic, endangering motorists and pedestrians, and causing flooding damage to adjacent properties.

PROJECT DESCRIPTION

Replace the existing 42-ft long 42-inch diameter culvert with new fish passable 10-ft wide by 5.5-ft high culvert counter sunk per Washington Department of Fish and Wildlife (WDFW) guidelines for scour resistance and to provide a natural streambed for physical habitat.

BENEFITS OF PROJECT

Replacing the culvert is expected to lower the Scriber Creek water levels to reduce overbank flooding and roadway flooding. This would Improve public safety, increase flow conveyance capacity, improve instream habitat, and improve fish passage.

Looking downstream to inlet of existing 189th St SW culvert.

Looking upstream to outlet of existing 189th St SW culvert.

FEASIBILITY CONSIDERATIONS

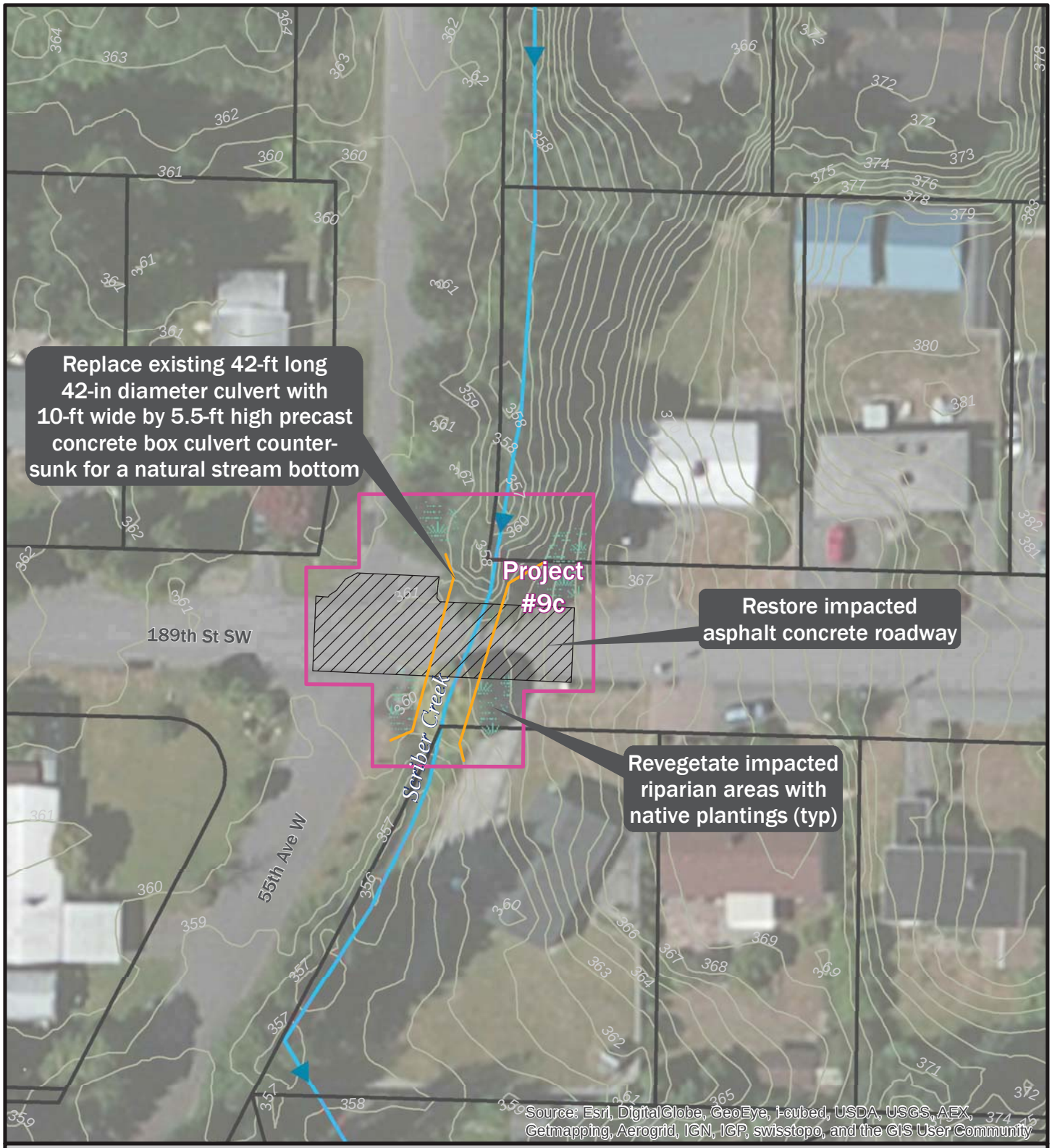
- Cut-and-cover construction.
- Temporary traffic detour during installation.
- Streamflow diversion and/or a flow bypass pipe/pumping likely needed.
- Bottomless concrete box structure placed on strip footing.
- Geotechnical exploration needed for design.
- Instream grade controls needed on downstream side to raise water surface profile through culvert.

PERMITS REQUIRED

- CWA Section 404 (USACE, NWP 3 - Maintenance)
- CWA Section 401 (Ecology, Certified through NWP 3)
- Hydraulic Project Approval (WDFW)
- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with mitigation (Lynnwood)

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- City of Lynnwood In-Lieu Fee Stormwater Program
- Salmon Recovery Funding Board (SRFB) Grant, Washington State Recreation and Conservation Office (RCO)
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)
- Cooperative Watershed Management Grant, WRIA 8 Salmon Recovery Council



Legend

- Proposed project area
- Scriber Creek
- Revegetation (typ.)
- Proposed culvert
- Proposed asphalt paving
- Existing 1-ft contour
- Parcel

Project #9c - Replace 189th Street SW Culvert.

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0 25 50 100 Feet

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #9c: Replace 189th Street Culvert.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$22,000	$22,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$20,000	$20,000	
1-05.4	SURVEYING	1	LS	$20,000	$20,000	Cost includes surveying entire project site and utility locates
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.05	ACRE	$10,000	$500	
2-02.5	REMOVE ASPHALT CONC. PAVEMENT	70	SY	$18	$1,260	comp plan quanitity, cost from WSDOT bid tabs for smaller project areas
2-02.5	REMOVAL OF STRUCTURE AND OBSTRUCTION	1	LS	$3,630	$3,630	comp plan, price adjusted
2-09.5	STRUCTURE EXCAVATION CLASS B INCL. HAUL	350	CY	$30	$10,500	comp plan quanitity, unit cost from Lynnwood 53rd Ave - winning bid
2-09.5	SHORING OR EXTRA EXCAVATION CLASS B	924	SY	$5	$4,620	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid
SPECIAL	10' W x 5.5' H CONCRETE BOX CULVERT STRUCTURE	1	EA	$39,900	$39,900	42' length; price from OldCastle incl delivery
SPECIAL	FOUNDATION PREPARATION	1	LS	$12,000	$12,000	estimate based on other culverts
SPECIAL	WING WALLS FOR ENTRANCE PROTECTION	1	LS	$18,150	$18,150	complan, price adjusted
SPECIAL	CULVERT INSTALLATION	1	LS	$24,200	$24,200	comp plan, price adjusted
SPECIAL	CHANNEL GRADE CONTROL STRUCTURES	1	LS	$6,050	$6,050	comp plan, price adjusted
4-04.5	CRUSHED SURFACING TOP COURSE	18	TN	$35	$630	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid
5-04.5	HMA CL. 1/2 IN. PG	22	TN	$110	$2,420	comp plan quantity, unit cost from Lynnwood 53rd Ave - winning bid - high number
9-03.11	STREAMBED SEDIMENT	58	TN	$40	$2,320	comp plan quanitity, unit cost from Parr and East
8-02.3	PSIPE - 1 GAL PLANTS - RIPARIAN PLANTINGS	650	EA	$10.00	$6,500	4' spacing on center, includes establishment
SPECIAL	GUARD RAIL REMOVAL AND REPLACEMENT	1	LS	$3,630	$3,630	comp plan, price adjusted
8-02.3	WET NATIVE SEEDING AND MULCHING	0.05	ACRE	$9,000	$450	Lynnwood 53rd Ave - winning bid
SPECIAL	STREAMFLOW DIVERSION / FLOW BYPASS	1	LS	$15,000	$15,000	
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$20,000	$20,000	
1-05.18	RECORD DRAWINGS	1	LS	$5,000.00	$5,000	
SUBTOTAL CONSTRUCTION COST					$239,760	
SALES TAX				9.8%	$23,500	
TOTAL CONSTRUCTION COST WITH TAX					**$263,300**	
OTHER APPROXIMATED PROJECT COSTS						
DESIGN				20%	$53,000	
ENVIRONMENTAL PERMITTING					$40,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications; permitting costs could be significantly reduced if bundled with other adjacent culvert projects
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$40,000	
TEMPORARY AND PERMANENT EASEMENT NEGOTIATION				5%	$14,000	
SPECIAL TESTING AND INSPECTIONS				5%	$14,000	
SUBTOTAL PROJECT COSTS					$424,300	
PROJECT CONTINGENCY				30%	$128,000	
			TOTAL ESTIMATED PROJECT COST:		**$550,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #9c: Replace 189st Street Culvert.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	2	TIMES/YEAR	$315	$630	frequency based on O&M table NPDES Phase II (2008)
	MOWING	2	TIMES/YEAR	$50	$100	Maintain plantings
	VACTOR TRUCK REMOVAL	0.5	TIMES/YEAR	$350	$175	Based on historical sediment maintenance data
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$905**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: 188th Street SW Flood Wall

Project Number: 10

Estimated Cost: $410,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The existing culvert crossing below 188th Street SW is a constriction and backwaters up into the wetland area north of 188th Street SW until the roadway is overtopped. Scriber Creek overtops 188th Street SW in a 10-year recurrence interval flood event, disrupting traffic, endangering motorists and pedestrians, and causing flooding damage to adjacent properties.

PROJECT DESCRIPTION

Construct about 200 linear feet of a short, approximately 1.5-ft high, concrete wall to elevation 364.6 ft +/- (NAVD 88 vertical datum) along the north side of 188th Street SW in the vicinity of the Scriber Creek culvert crossing (at the low point in the road) to reduce the frequency of roadway overtopping and provide additional flood storage upstream. This wall would encourage further backwater and flood storage in the vacant property owned by the City of Lynnwood just north of 188th St SW. The wall would be designed with a short section of overflow weir to concentrate flows that overtop the wall, so that the wall does not fail during overtopping flows. A handrail will be added on top of wall to replace the existing fence and rail that would need to be removed to make room for the new wall.

BENEFITS OF PROJECT

Reduces the frequency of roadway overtopping to the 25-year event. Also decreases downstream flow by creating upstream storage. This project improvement would add about 2.9 acre-feet of flood storage in the 100-year event. Additional storage would be provided if Project 11 is implemented.

December 4, 2007 overtopping of 188th Street SW.

Looking north across 188th St SW to location of potential flood wall.

FEASIBILITY CONSIDERATIONS

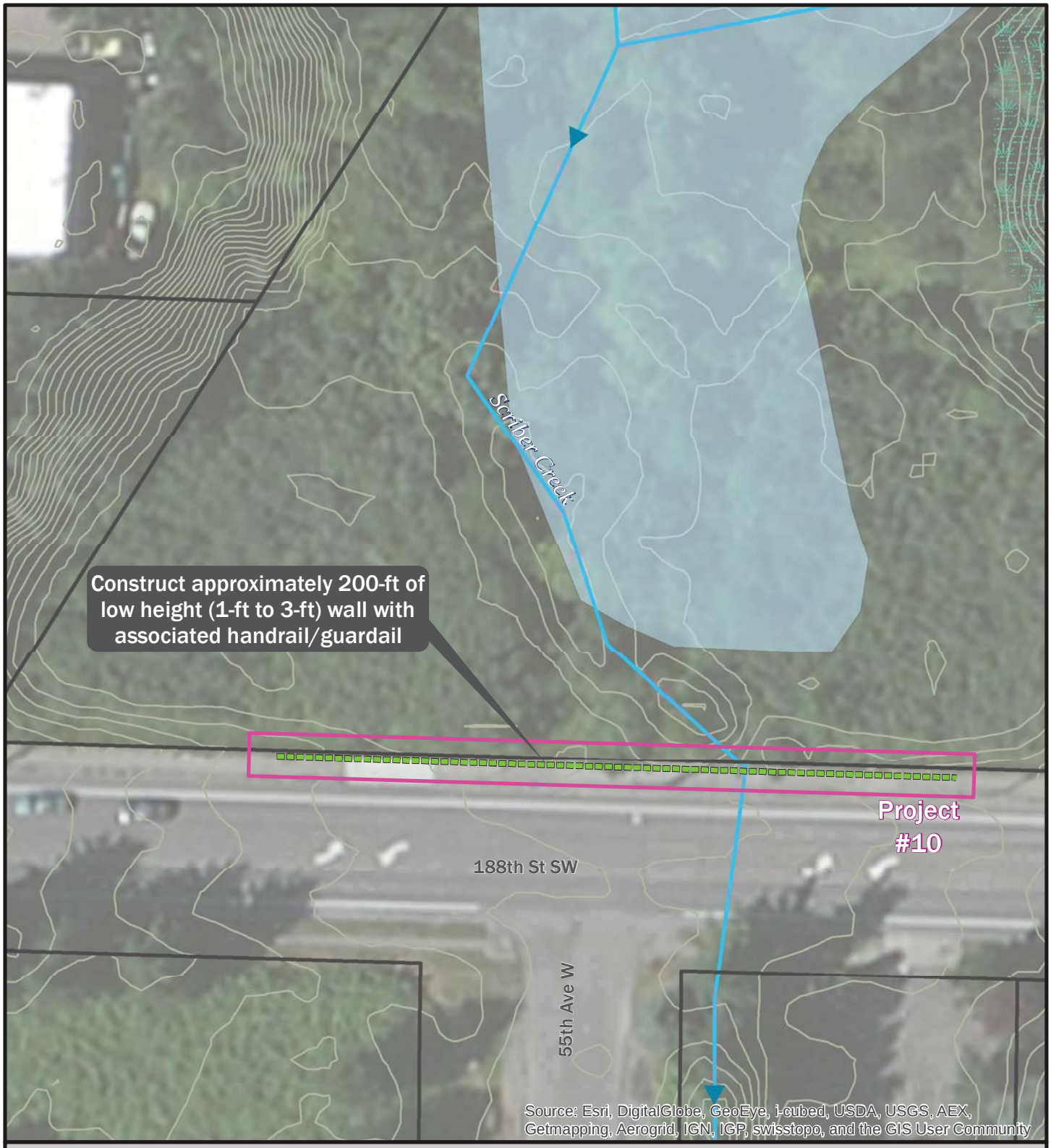
- Need to align the wall to avoid hydrant and allow for minimum clear distance.
- Need approval from City of Lynnwood transportation department because the wall would be within the clear zone.
- Some traffic control and lane closures are expected during construction so that machinery can access via the sidewalk and westbound lane.
- If existing subsoils are soft and unsuitable for a wall foundation, soil excavation and replacement with structural fill may be necessary.

PERMITS REQUIRED

- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with potential mitigation for impacts to buffers (Lynnwood)

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- Salmon Recovery Funding Board (SRFB) Grant, Washington State Recreation and Conservation Office (RCO)
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)



Legend

- Proposed project area
- Proposed flood wall
- Scriber Creek
- Revegetation (typ.)
- Existing 1-ft contour
- Snohomish County wetland
- Parcel

Project #10 - Construction of Flood Wall.

N

0 20 40 80 Feet

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #10: 188th Street SW Flood Wall Project.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$16,000	$16,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$15,000	$15,000	
1-05.4	SURVEYING	1	LS	$15,000	$15,000	Cost includes surveying entire project site and utility locates
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.1	ACRE	$10,000	$1,000	
2-02.5	REMOVAL OF STRUCTURES AND OBSTRUCTIONS	1	LS	$6,000	$6,000	
2-09.5	STRUCTURE EXCAVATION	300	CY	$30	$9,000	excavation required to install approx. 1ft deep wall foundation
SPECIAL	WALL-CONCRETE (VARYING HEIGHT)	200	LF	$200	$40,000	
SPECIAL	HANDRAIL	200	LF	$150	$30,000	Handrail built into top of wall
6-02.5	STEEL PILE	20	EA	$1,500	$30,000	Assume integrated with wall for support
8-14.5	CEMENT CONC SIDEWALK	40.0	SY	$80	$3,200	Only around culvert
8-02.5	SEEDING AND MULCHING	0.1	ACRE	$10,000	$1,000	
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$5,000	$5,000	
1-05.18	RECORD DRAWINGS	1	LS	$1,000	$1,000	
SUBTOTAL CONSTRUCTION COST					$173,200	
SALES TAX				9.8%	$16,980	
TOTAL CONSTRUCTION COST WITH TAX					**$190,200**	
OTHER APPROXIMATED PROJECT COSTS						
DESIGN				20%	$39,000	
ENVIRONMENTAL PERMITTING				10%	$20,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$29,000	
SPECIAL TESTING AND INSPECTIONS				5%	$10,000	includes geotechnical analysis to ensure no settlement of existing culvert below wall
SUBTOTAL PROJECT COSTS					$288,200	
PROJECT CONTINGENCY				30%	$87,000	includes any coordination for access/easements
			TOTAL ESTIMATED PROJECT COST:		**$380,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project 10: 188th Street SW Flood Wall Project.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	1	TIMES/YEAR	$315	$315	Inspect after a severe storm.
	MOWING	1	TIMES/YEAR	$50	$50	Mowing part of typical ROW mowing
	VACTOR TRUCK REMOVAL	0	TIMES/YEAR	$350	$0	
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$365**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Maximize off-channel Storage on the property north of 188th Street SW

Project Number: 11 Estimated Cost: $690,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The existing culvert crossing below 188th Street SW is a constriction and backwaters up into the wetland area north of 188th Street SW until the roadway is overtopped. Scriber Creek overtops 188th Street SW in a 10-year recurrence interval flood event, disrupting traffic, endangering motorists and pedestrians, and causing flooding damage to adjacent properties.

PROJECT DESCRIPTION

Maximize flood storage and floodplain reconnection within the City-owned vacant property located north of 188th Street SW. This improvement would include excavating portions of the property to create new wetlands and also provide flood storage. The excavation areas would be designed to maintain existing wetlands (potentially as islands or hummocks) as well as large evergreen trees to the extent practical. The off-channel floodplain area will be graded to be inundated primarily during peak flood events and to have positive drainage toward the downstream portion of the property to avoid fish stranding. Wetland hummocks and Large Woody Debris (LWD) will be installed for enhanced edge habitat, microtopography, and physical habitat complexity. The entire site will be revegetated with native wetland and riparian vegetation.

BENEFITS OF PROJECT

In combination with Project #10, this project would add about 3.7 acre-feet of flood storage in the 100-year event; improved instream habitat; greater connectivity of channel to floodplain wetland areas, providing flood storage capacity; retention of sediments transported from upstream; reduced sediment removal burden on the City in downstream locations.

Mitigation site north of 188th St SW that excavation would connect to.

Existing upland area in City Parks property that could be excavated.

FEASIBILITY CONSIDERATIONS

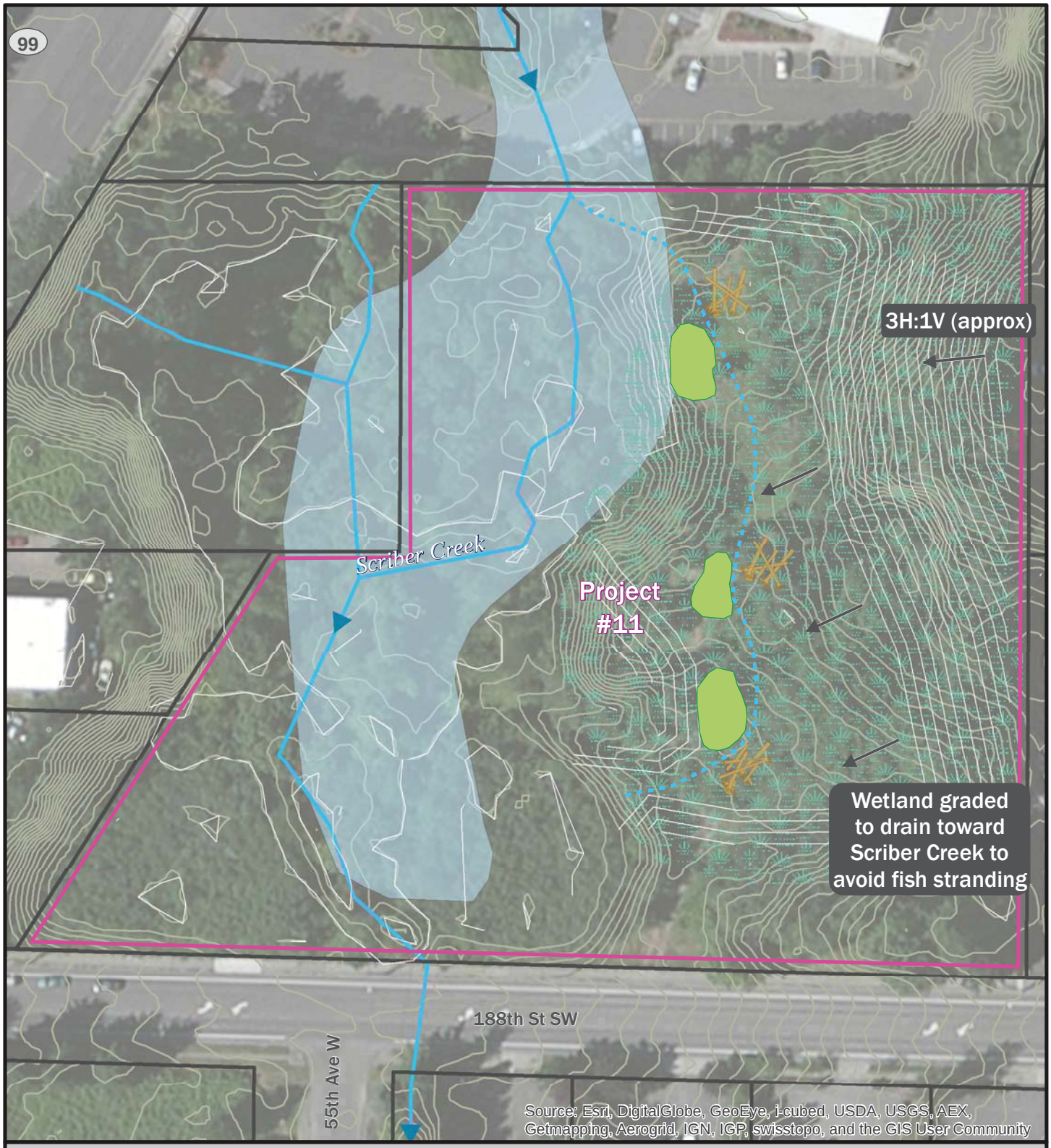
- City of Lynnwood Parks Department will need to provide easements and access for the City to perform construction work.
- Streamflow diversion or flow bypass pipe/pumping likely required.
- Minor bank regrading, and installation of vegetated geogrids or similar bank stabilization measures with reinforced soil and native plantings is likely to be needed, especially along the north or east slopes where seepage could daylight.
- Emphasizing the restoration and habitat enhancement opportunities will support grant applications for the work.
- All work within ordinary high water (OHW) must be completed during the "fish window". Due to the proximity of the channel/floodplain to the excavation area, it is likely best to also complete work above OHW during the fish window.

PERMITS REQUIRED

- CWA Section 404 (USACE, NWP 27 - Restoration)
- CWA Section 401 (Ecology, Certified through NWP 27)
- Hydraulic Project Approval (WDFW)
- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with mitigation (Lynnwood)

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- City of Lynnwood In-Lieu Fee Stormwater Program
- Salmon Recovery Funding Board (SRFB) Grant, Washington State Recreation and Conservation Office (RCO)
- Washington Wildlife and Recreation Program (WWRP), RCO
- Land and Water Conservation Fund (LWCF), RCO
- Centennial Grant, Washington State Department of Ecology (Ecology)
- Water Quality: Section 319 Grant, Ecology
- Stormwater Financial Assistance, Ecology
- Five Star and Urban Waters Restoration Programs, National Fish and Wildlife Foundation (NFWF)
- Cooperative Watershed Management Grant, WRIA 8 Salmon Recovery Council
- Aquatic Lands Enhancement Account (ALEA) Volunteer Cooperative Grant Program, WDFW



Legend

- Proposed project area
- Scriber Creek
- Proposed high flow side channel alignment
- Revegetation (typ.)
- Wetland hunmocks for edge habitat (typ.)
- LWD
- Proposed project grading
- Existing 1-ft contour
- Snohomish County wetland
- Parcel

Project #11 - Maximixe Off-Channel Storage on the City of Lynnwood's Property North of 188th Street.

N

0 37.5 75 150 Feet

LYNNWOOD WASHINGTON

K:\Projects\Y2012\12-05479-001\Project\Summary Sheet figures\project11.mxd (2/19/2016)

Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #11: Off-Channel Storage on City's 188th Street Property.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$27,000	$27,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$24,000	$24,000	
1-05.4	SURVEYING	1	LS	$25,000	$25,000	Cost includes surveying entire project site and utility locates
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	1.80	ACRE	$10,000	$18,000	
SPECIAL	BULK EXCAVATION INCL. HAUL	2220	CY	$25	$55,500	approximated quantity consistent with modeled storage needs; unit cost from Lynnwood 53rd Ave - winning bid
2.03-5	CHANNEL EXCAVATION INCL. HAUL	130	CY	$50	$6,500	350' long, 5' wide, 2' deep side channel, unit cost from Lynnwood 204th - winning bid
SPECIAL	LWD GRADE CONTROL AND HABITAT STRUCTURES	5	EA	$6,000	$30,000	Cost based on recent bid tabs for similar stream log structure installations
SPECIAL	NEW PEDESTRIAN BRIDGE ACROSS CREEK	1	LS	$15,000	$15,000	includes new prefabricated pedestrian bridge and cast-in-place footings/foundation
SPECIAL	TRAIL AND SITE IMPROVEMENTS FOR PARKS	1	LS	$15,000	$15,000	Assumes project area will remain parks property and require access/trail improvements
8-02.3	PSIPE - 1 GAL PLANTS - RIPARIAN PLANTINGS	1,400	EA	$10.00	$14,000	approximately 8' spacing on center, unit cost from Lynnwood 53rd Ave - winning bid
8-02.3	WET NATIVE SEEDING AND MULCHING	1.80	ACRE	$9,000	$16,200	400' x 200', assume only regraded area is seeded, does not include main channel, unit cost from Lynnwood 204th - winning bid
SPECIAL	STREAMFLOW DIVERSION / FLOW BYPASS	1	LS	$15,000	$15,000	most excavation outside OHW; short streamflow bypass needed to connect new storage area to creek
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$20,000	$20,000	
9-03.11	STREAMBED SEDIMENT	140	TN	$40	$5,600	1' thick in side channel, unit cost from Parr and East
1-05.18	RECORD DRAWINGS	1	LS	$5,000	$5,000	
SUBTOTAL CONSTRUCTION COST					$292,800	
SALES TAX				9.8%	$28,700	
TOTAL CONSTRUCTION COST WITH TAX					**$321,500**	
OTHER APPROXIMATED PROJECT COSTS						
DESIGN				20%	$65,000	
ENVIRONMENTAL PERMITTING					$40,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$49,000	
SPECIAL TESTING AND INSPECTIONS				5%	$17,000	
SUBTOTAL PROJECT COSTS					$492,500	
PROJECT CONTINGENCY				30%	$148,000	includes any coordination for access/easements
			TOTAL ESTIMATED PROJECT COST:		**$640,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #11: Off-Channel Storage on City's 188th Street Property.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	2	TIMES/YEAR	$315	$630	frequency based on O&M table NPDES Phase II (2008)
	MOWING	1	TIMES/YEAR	$50	$50	Maintain plantings
	VACTOR TRUCK REMOVAL	1	TIMES/YEAR	$350	$350	Based on historical sediment maintenance data
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$1,030**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Install small berms near Eunia Plaza and Flynn's Carpets

Project Number: 12 Estimated Cost: $230,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

Scriber Creek overtops its banks in the 10-year event causing flooding of adjacent business parking lots and access.

PROJECT DESCRIPTION

Berm open channel segments of Scriber Creek between driveway culverts near Flynn's Carpets, the Old Buzz Inn, and Eunia Plaza. The west side of the channel would be bermed between the two culverts at Eunia Plaza, where the crest of the berm would need to be at about Elevation 368.3 ft (NAVD 88 vertical datum) , which would not provide any freeboard for the 100-year flow. Raising the berm further would raise it above the drive over the culvert. In addition, berms would be added on either side of the creek (beyond the top of the creek bank) near Flynn's Carpets and along the west side of creek from the pedestrian bridge at Flynn's to the Old Buzz Inn building, to protect low-lying areas of adjacent properties. Backflow prevention and a pipe extension (potentially to Scriber Creek at north end of City Park Property north of 188th St) to collect runoff from low parking areas would be required.

BENEFITS OF PROJECT

Provides protection to Flynn's Carpets and Eunia Plaza from overtopping during the 100-year event. Reduced flooding of businesses and access thereby improves public safety.

March 14, 2011 Flooding near Flynn's Carpets.

Curb within Eunia Plaza parking lot that berm could tie in to.

FEASIBILITY CONSIDERATIONS

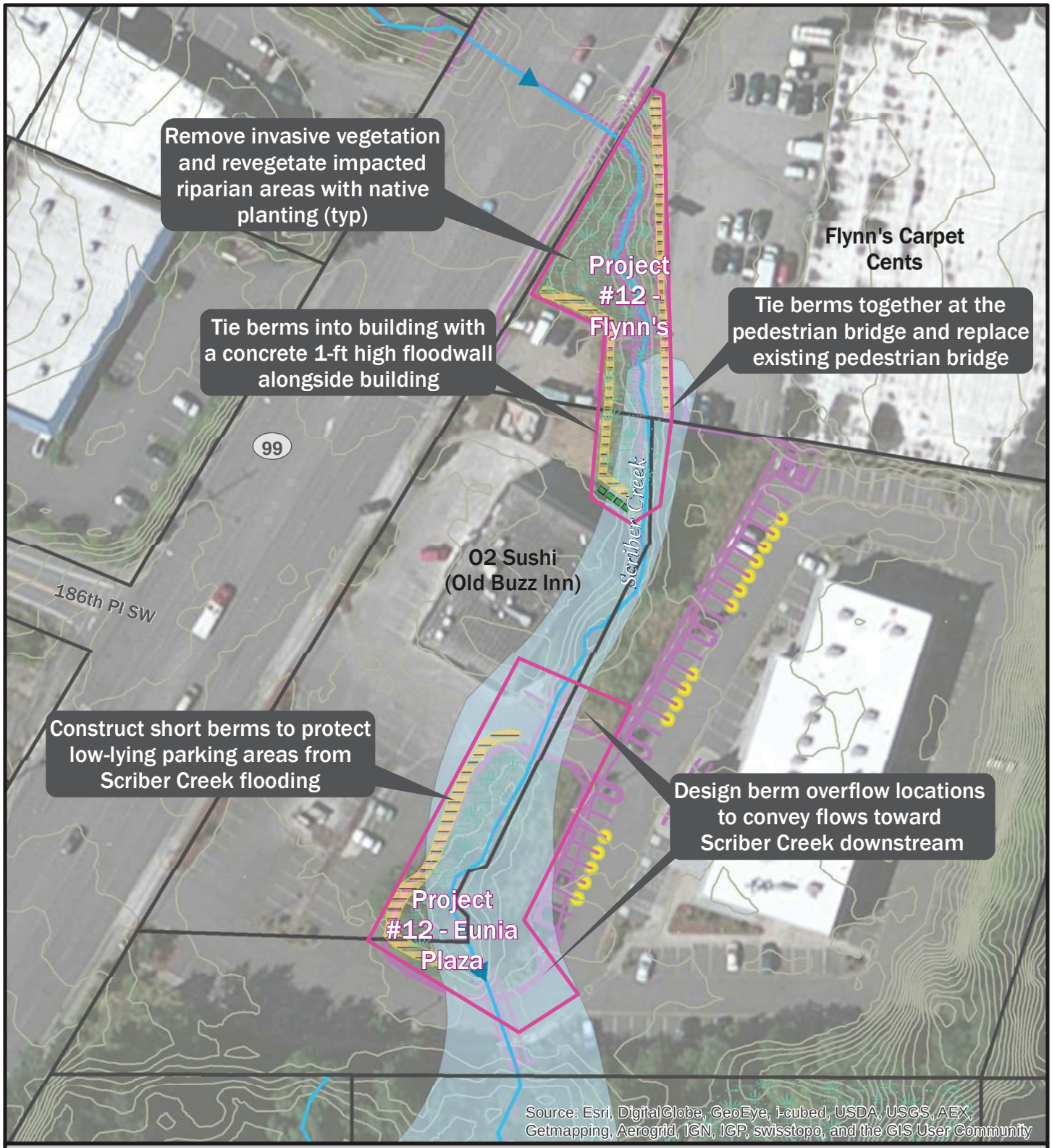
- Annual inspection of check valves and berms needed.
- Maintenance of berm and planted vegetation to be required.
- Additional design needs to be performed to evaluate outfalls and berm size and locations prior to budgeting for this project.
- Assumes no work within OHW or wetlands, but stream buffer vegetation enhancement is anticipated.
- If existing subsoils are soft and unsuitable for a berm or wall foundation, soil excavation and replacement with structural fill may be necessary.

PERMITS REQUIRED

- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with potential mitigation for impacts to buffers (Lynnwood)

POTENTIAL FUNDING SOURCES

- Cost-sharing program with private property owners
- City of Lynnwood Surface Water Utility Fund



Legend

- Proposed project area
- Scriber Creek
- Revegetation (typ.)
- Proposed berm
- Proposed flood wall
- Existing 1-ft contour
- Surveyed line
- Surveyed point
- Snohomish County wetland
- Parcel

Project #12 - Install Small Berm Near Eunia Plaza and Flynn's Carpet.

N

0 37.5 75 150 Feet

LYNNWOOD WASHINGTON

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Table 1. Planning Level Design, Permitting, and Construction Cost Estimate for Project #12: Berm Open Channels between Driveways.

Spec Section	Bid Item Description	Quantity	Unit	Unit Cost	Amount	Assumptions/Notes
1-09.7	MOBILIZATION (10%)	1	LS	$8,000	$8,000	
1-10.5	PROJECT TEMPORARY TRAFFIC CONTROL (10%)	1	LS	$7,000	$7,000	
1-05.4	SURVEYING	1	LS	$15,000	$15,000	Cost includes surveying entire project site and utility locates
1-07.15	SPCC PLAN	1	LS	$1,000	$1,000	
2-01.5	CLEARING AND GRUBBING	0.20	ACRE	$10,000	$2,000	
2-03.5	EMBANKMENT COMPACTION	191	CY	$4	$764	WSDOT bid tabs/UBA
SPECIAL	LOW PERMEABILITY FILL FOR BERM	411	TN	$30	$12,330	2:1 side slopes, 2' wide crest, eunia plaza: x-sec area 5.5 sf, 100 long , flynn's carpet: x-sec 15 sf, length 200',
SPECIAL	WALL-CONCRETE (VARYING HEIGHT)	20	LF	$200	$4,000	small flood wall to tie berm into back of old Buzz Inn building
SPECIAL	NEW PEDESTRIAN BRIDGE ACROSS CREEK	1	LS	$15,000	$15,000	includes new prefabricated pedestrian bridge and cast-in-place footings/foundation
8-02.3	PSIPE - 1 GAL PLANTS - RIPARIAN PLANTINGS	300	EA	$10.00	$3,000	4' spacing on center, includes establishment
8-02.3	WET NATIVE SEEDING AND MULCHING	0.20	ACRE	$9,000	$1,800	Lynnwood 53rd Ave - winning bid
8-02.6	LANDSCAPE RESTORATION	1.0	LS	$4,000	$4,000	to restore landscaped areas to pre-construction conditions
8-01.5	EROSION/WATER POLLUTION CONTROL	1	LS	$5,000	$5,000	
1-05.18	RECORD DRAWINGS	1	LS	$5,000	$5,000	
SUBTOTAL CONSTRUCTION COST					$83,894	
SALES TAX				9.8%	$8,230	
TOTAL CONSTRUCTION COST WITH TAX					**$92,100**	
OTHER APPROXIMATED PROJECT COSTS						
ADMINISTRATIVE COSTS FOR COST-SHARING APPROACH NEGOTIATION				5%	$5,000	
DESIGN				30%	$28,000	
ENVIRONMENTAL PERMITTING					$15,000	Includes costs of all technical evaluation, preparing supporting documentation, and submitting the permit applications
CONSTRUCTION MANAGEMENT/CONSTRUCTION ADMINISTRATION				15%	$14,000	
TEMPORARY AND PERMANENT EASEMENT NEGOTIATION				5%	$5,000	
SPECIAL TESTING AND INSPECTIONS				5%	$5,000	
SUBTOTAL PROJECT COSTS					$159,100	
PROJECT CONTINGENCY				30%	$48,000	
			TOTAL ESTIMATED PROJECT COST:		**$210,000**	Estimate based on 2016 dollars, rounded to nearest $10,000; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

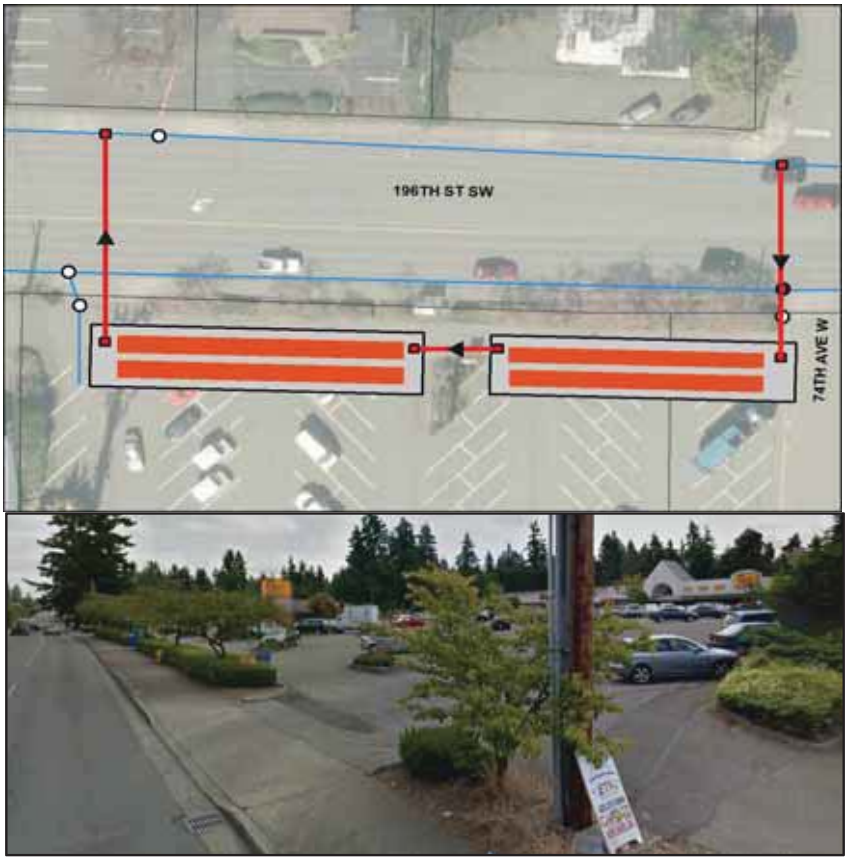
Table 2. Planning Level Annual Operations and Maintenance Cost Estimate for Project #12: Berm Open Channels between Driveways.

PROJECT LIFE CYCLE 30 YEARS

	Maintenance Activity Type	Frequency	Unit	Unit Cost/Time	Annual Amount	Assumptions/Notes
	INSPECTION	1	TIMES/YEAR	$315	$315	Inspect after a severe storm.
	MOWING	2	TIMES/YEAR	$50	$100	maintain plantings
	VACTOR TRUCK REMOVAL	0	TIMES/YEAR	$350	$0	
TOTAL ANNUAL OPERATIONS AND MAINTENANCE COSTS					**$415**	Estimate based on 2016 dollars; costs will need to be adjusted for Time Value of Money (TMV) when programming funds.

TETRA TECH

Pipe Detention Site 19-1
City of Edmonds Stormwater Retrofit



PROJECT DESCRIPTION

This 8' diameter manifold detention pipe retrofit intercepts drainage which is redirected from the north side of 196th St SW to the Quality Foods Center parking lot. The proposed system would detain and slowly releases runoff back into the storm system in 196th St SW. Because this system is located on private property, it would require coordination/acquisition of property/easements from the owner/developer.

SITE BENEFITS

- Ample area within existing site is available for construction activities
- No parking reduction resulting from retrofit
- All facilities will be underground and no existing land use changes proposed

SITE CONSTRAINTS/DIFFICULTIES

- Proposed system is within private property

  Poor soils do not allow for infiltration

RETROFIT TYPE

Manifold Pipe Detention Facility

LOCATION

7500 196th St SW
near 76th Ave W, Lynnwood

EXISTING USE

QFC parking lot is private property with heavy traffic.

TRIBUTARY DRAINAGE AREA

35.67 Acres
16.26 Acres Impervious

SITING NOTES

Proposed location is private property with moderate slope.

FLOW REDUCTION

Existing 2-yr	5.75 cfs
Mitigated 2-yr	1.25 cfs
Flow Reduction	4.50 cfs

COST

$1,123k, $250k* per 1 cfs reduced.

*These costs do not reflect any cost for easements or private property acquisitions

City of Edmonds
LID Retrofits for Perrinville Creek
Planning Level Estimate

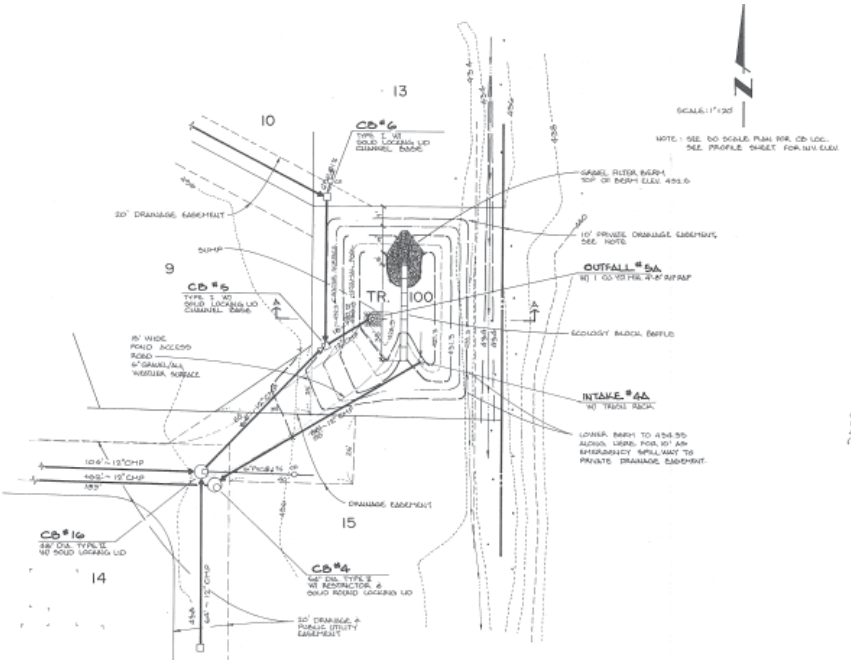
ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
	SITE 19-1				
1	MOBILIZATION (10%)	1	LS	$ 53,446	$ 53,446
2	CONTRACTOR PROVIDED SURVEY (3%)	1	LS	$ 16,034	$ 16,034
3	TESC (5%)	1	LS	$ 26,723	$ 26,723
4	SAWCUTTING	1890	LF	$ 2	$ 3,780
5	STRUCTURAL EXCAVATION CLASS B INCL. HAUL	4504	CY	$ 35	$ 157,630
6	8' DIAM. PIPE DETENTION SYSTEM	900	LF	$ 250	$ 225,000
7	TESTING STORM SEWER PIPE	200	LF	$ 2	$ 400
8	SCHEDULE A STORM SEWER PIPE 24 IN. DIAM.	200	LF	$ 65	$ 13,000
9	GRAVEL BACKFILL FOR DRAIN	3752	TON	$ 22	$ 82,547
10	AREA DRAIN	2	EA	$ 800	$ 1,600
11	FLOW RESTRICTOR	1	EA	$ 3,000	$ 3,000
12	CATCH BASIN	4	EA	$ 4,000	$ 16,000
13	CONNECTION TO DRAINAGE STRUCTURE	2	EA	$ 750	$ 1,500
14	PAVEMENT PATCH	1	LS	$ 10,000	$ 10,000
15	LANDSCAPING	1	LS	$ 10,000	$ 10,000
16	TRAFFIC CONTROL	1	LS	$ 10,000	$ 10,000

CONSTRUCTION SUBTOTAL		$630,659
DESIGN CONTINGENCY	30%	$189,198
PERMITTING	5%	$31,533
DESIGN	15%	$94,599
CITY PROJECT MGMT. ADMINISTRATION	3%	$18,920
CONSTRUCTION MANAGEMENT	15%	$94,599
MANAGEMENT RESERVE	10%	$63,066
PROJECT TOTAL COST		**$1,122,573**

All cost estimates are presented in 2014 dollars.

TETRA TECH

Copper Ridge Pond Site 20-1
City of Edmonds Stormwater Retrofit



PROJECT DESCRIPTION

This retrofit modifies the existing Copper Ridge detention pond orifice control structure.

SITE BENEFITS

- Minimal impact from construction – simple in manhole retrofit
- No parking reduction resulting from retrofit
- All facilities will be underground and no existing land use changes proposed

SITE CONSTRAINTS/DIFFICULTIES

- Thick till layer does not allow for infiltration retrofit opportunity within existing pond
- Flow control structure is located on private property and detention pond located on City of Lynnwood Property
- Construction would require private owner coordination
- More detailed study of existing pond conditions and hydraulics may be required

RETROFIT TYPE

Orifice Structure Alteration
Detention Pond Facility

LOCATION

7009 196th St SW
near 70th Pl W, Lynnwood

EXISTING USE

Detention Pond Facility

TRIBUTARY DRAINAGE AREA

3.84 Acres
1.73 Acres Impervious

SITING NOTES

Existing control structure is an orifice riser located southwest of the pond

FLOW REDUCTION

Existing 2-yr	0.60 cfs
Mitigated 2-yr	0.22 cfs
Flow Reduction	0.38 cfs

COST

$22k, $58k per 1 cfs reduced.

TETRA TECH

Blue Ridge Pond Site 22-1
City of Edmonds Stormwater Retrofit

PROJECT DESCRIPTION

This retrofit to the flow control structure for the Blue Ridge Pond consists of replacement of the existing orifice with a smaller size to maximize pond storage leading to flow reduction.

SITE BENEFITS

- Flow control structure is wholly within the public right of way
- Minimal impact from construction – simple in manhole retrofit
- Large tributary area with significant flow reduction
- No parking reduction resulting from retrofit
- All facilities will be underground and no existing land use changes proposed

SITE CONSTRAINTS/DIFFICULTIES

- Thick till layer does not allow for infiltration retrofit opportunity within existing pond

RETROFIT TYPE

Orifice Structure Alteration
Detention Pond Facility

LOCATION

18601 71st Ave W
at 186th St SW, Lynnwood

EXISTING USE

Detention Pond Facility

TRIBUTARY DRAINAGE AREA

55.2 Acres
14.5 Acres Impervious

SITING NOTES

Existing control structure is a 11.25” orifice riser located in a manhole at the intersection of 71st Ave W and 186th St SW

FLOW REDUCTION

Existing 2-yr	5.77 cfs
Mitigated 2-yr	3.22 cfs
Flow Reduction	2.55 cfs

COST

$22k, $9k per 1 cfs reduced.

Pipe Detention Site 26-1
City of Edmonds Stormwater Retrofit

PROJECT DESCRIPTION

This 8' diameter detention pipe retrofit intercepts drainage from a residential area to the east and detains and slowly releases runoff. Proposed location for the detention pipe is a wide grass shoulder area along 74th Ave W. Stormwater release is through a flow control orifice with overflow to attenuate peak flows.

SITE BENEFITS

- Proposed system is completely within the Public Right of Way
- Wide shoulder area with ample area available for construction
- No parking reduction resulting from retrofit
- All facilities will be underground and no existing land use changes proposed

SITE CONSTRAINTS/DIFFICULTIES

- Adjacent steep slopes to east and west do not allow for infiltration
- Pipe replacement downstream may be needed to allow for deeper invert connection
- Option to expand or relocate facility to natural drainage course within private properties to the east

RETROFIT TYPE

Pipe Detention Facility

LOCATION

7332 192nd Pl SW
on 74th Ave W, Lynnwood

EXISTING USE

Roadside grass area

TRIBUTARY DRAINAGE AREA

28.07 Acres
11.51 Acres Impervious

SITING NOTES

Steep slopes to east and west

FLOW REDUCTION

Existing 2-yr	4.20 cfs
Mitigated 2-yr	2.81 cfs
Flow Reduction	1.39 cfs

COST

$286k, $206k per 1 cfs reduced.

City of Edmonds
LID Retrofits for Perrinville Creek
Planning Level Estimate

ITEM NO.	ITEM	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
	SITE 26-1				
1	MOBILIZATION (10%)	1	LS	$ 11,019	$ 11,019
2	CONTRACTOR PROVIDED SURVEY (3%)	1	LS	$ 3,306	$ 3,306
3	TESC (5%)	1	LS	$ 5,510	$ 5,510
4	SAWCUTTING	140	LF	$ 2	$ 280
5	STRUCTURAL EXCAVATION CLASS B INCL. HAUL	541	CY	$ 35	$ 18,926
6	8' DIAM. PIPE DETENTION SYSTEM	130	LF	$ 250	$ 32,500
7	SCHEDULE A STORM SEWER PIPE 12 IN. DIAM.	50	LF	$ 40	$ 2,000
8	GRAVEL BORROW INCLUDING HAUL	799	TON	$ 22	$ 17,585
9	FLOW RESTRICTOR	1	EA	$ 3,000	$ 3,000
10	CATCH BASIN	2	EA	$ 4,000	$ 8,000
11	CONNECTION TO DRAINAGE STRUCTURE	2	EA	$ 750	$ 1,500
12	PAVEMENT PATCH	1	LS	$ 10,000	$ 10,000
13	LANDSCAPING	1	LS	$ 10,000	$ 10,000
14	TRAFFIC CONTROL	1	LS	$ 6,400	$ 6,400

CONSTRUCTION SUBTOTAL		$130,025
DESIGN CONTINGENCY	50%	$65,012
PERMITTING	5%	$6,501
DESIGN	25%	$32,506
CITY PROJECT MGMT. ADMINISTRATION	5%	$6,501
CONSTRUCTION MANAGEMENT	25%	$32,506
MANAGEMENT RESERVE	10%	$13,002
PROJECT TOTAL COST		**$286,055**

All cost estimates are presented in 2014 dollars.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: 180th St. SW Bioretention Swale

Project Number: 15

Estimated Cost: $210,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

Stormwater runoff from urban development transports sediment, oil, and metals into Scriber Creek. This location was identified as a suitable location for stormwater retrofit through field reconnaissance as a priority location because of significant available space along the edge of the roadway. It also presents an opportunity to improve pedestrian mobility by replacing an existing overgrown path with permeable pavement sidewalk.

PROJECT DESCRIPTION

Install bioretention and permeable pavement sidewalks along the south side of 180th Street SW, west of State Route 99, to manage runoff. The cost estimate assumes that the bioretention facility footprint will be 200 feet long by eight feet wide and includes replacement of the adjacent sidewalk and installation of a curb to provide pedestrian safety. The estimate assumes a critical areas report is required for the project due to proximity to Scriber Creek. A simplified version of this project may become part of the Rain Garden program.

BENEFITS OF PROJECT

Improved detention, infiltration, and pollutant removal (e.g., metals, phosphorus, oil, and suspended sediments) to improve water quality in Scriber Creek and increase native habitat along the riparian corridor by adding native plants along the roadway.

Potential project location facing west.

Example bioretention facility.

FEASIBILITY CONSIDERATIONS

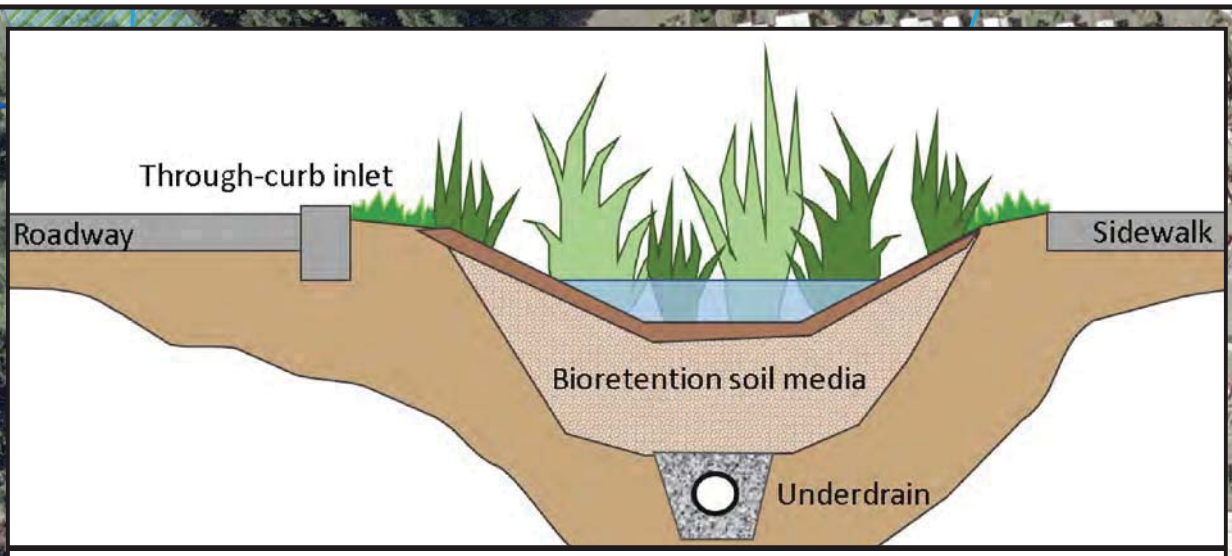
- The wide planter strip makes this location suitable for bioretention along the edge of the road without major reconfiguration.
- Infiltration potential of the soils and groundwater level may limit ability to provide flow control at this location.
- Existing utilities do not appear to conflict with the concept, but need further confirmation.
- This project is near a riparian corridor so critical areas reporting may be required.

PERMITS REQUIRED

- Grading Permit (Lynnwood)
- ROW Permit (Lynnwood)
- Critical Areas Permit (possibly)
- SEPA Determination

POTENTIAL FUNDING SOURCES

- Water Quality: Section 319 Grant, Ecology



Cross Section - Proposed Bioretention Facility and Sidewalk Replacement (NTS)

Proposed Bioretention and Sidewalk Replacement

180th St SW

Area: 1.3 acres

Pacific Hwy 99

Legend

- Proposed bioretention and sidewalk replacement (see cross section above)
- Drainage basin
- Wetland
- Stormwater channels
- Stormwater pipes
- Stream

Surface Water CIP 15
180th St. SW Bioretention Swale.

N

0 80 160 320 Feet

HERRERA

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Engineering Construction Cost Estimate for Conceptual Design

Project Name: **180th St. SW Bioretention Swale**
Project Number: **16-06374-000**
Client: **City of Lynnwood**

QA Review

Completed/Updated By: Meghan Mullen / Matt Fontaine
Last Updated On: 2/27/2019
Reviewed By: Mary Larkin
Reviewed On: 2/20/2019
Approved By: Matt Fontaine
Approved On: 2/27/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 6,678.07
2		Erosion/Water Pollution Control	1	L.S.	5%	$ 2,783
3		Utility Protection and Relocation	1	L.S.	10%	$ 5,565.06
4		Project Temporary Traffic Control	2	L.S.	5%	$ 2,783
	Div 2	**Earthwork**				
5		Removing Asphalt Conc. Sidewalk, Incl. Haul	111	S.Y.	$ 25	$ 2,778
6		Ditch Excavatoin, Incl. Haul	119	C.Y.	$ 40	$ 4,741
	Div 4	**Bases**				
7		Aggregate for Permeable Base	19	C.Y.	$ 80	$ 1,481
	Div 5	**Surface Treatments and Pavements**				
8		Pervious Concrete Pavement	12	C.Y.	$ 500	$ 6,173
9		Concrete Curb	200	L.F.	$ 50	$ 10,000
	Div 7	**Drainage Structures, Storm Sewers, Sanitary Sewers, Water Mains, and Conduits**				
10		Outlet Structure	1	Each	$ 2,000	$ 2,000
11		Schedule A Stormwater Sewer Pipe, 12 In. Dia.	20	L.F.	$ 60	$ 1,200
12		Underdrain Pipe 6 in. Diam.	200	L.F.	$ 30	$ 6,000
	Div 8	**Miscellaneous Construction**				
13		Bioretention Soil Media	67	C.Y.	$ 150	$ 10,000
14		Compost Blanket	178	C.Y.	$ 10	$ 1,778
15		Native Plantings	1,400	S.F.	$ 5	$ 7,000
16		Inflow Spreader and Check Dams	5	Each	$ 500	$ 2,500
		Construction Subtotal				**$ 73,459**
		Contingency	50%			**$ 36,729**
		Subtotal (with +50% Contingency)				**$ 110,188**
		Tax	8.5%			**$ 9,366**
		Construction Total (with Contingency and Tax)				**$ 119,554**
		Design / Geotechnical / Survey	40%			$ 47,822
		Permitting				$ 20,000
		Construction management	10%			$ 11,955
		City Project Management	10%			$ 11,955
		Estimated Project Total (rounded to 2 significant figures)				**$ 210,000**

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Golde Creek Stormwater Pond Retrofit

Project Number: 16

Estimated Cost: $400,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

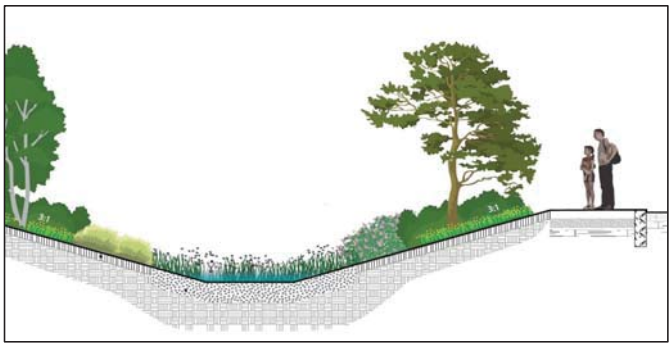
Runoff from urban development in the watershed has led to water quality degradation in Golde Creek. Golde Creek is a potential source of fecal coliform bacteria in Swamp Creek downstream (which has a TMDL for fecal coliform bacteria). On the south side of Alderwood Mall Parkway and to the east of Golde Creek, an unmaintained stormwater pond discharges to Golde Creek. The pond does not appear to be functioning as designed. The existing pond is an opportunity to provide state of the art treatment for stormwater stormwater treatment that is consistent with current regulations.

PROJECT DESCRIPTION

Rehabilitate and enhance the existing dysfunctional facility by improving and modernizing the treatment processes within the existing facility footprint with a wetpond size of 4,000 square feet and a drainage area of 3.21 acres. The cost estimate is based on the ongoing Park Place Stormwater Facility Design with cost scaled based on a similar stormwater facility rehabilitation project in Bellingham, Washington with adjustments made for relative size and complexity of the facility. The design includes a pretreatment BMP, wetpond, and sand filter.

BENEFITS OF PROJECT

Enhanced storage, infiltration, and pollutant removal (e.g., metals, phosphorus, oil, and suspended sediments).



Possible pond cross-section.

Stormwater pond outlet.

FEASIBILITY CONSIDERATIONS

- Size of the treatment area and design flow rate may impact the design. The size of the facility is constrained to the existing footprint.
- Desired performance of the facility may impact the type of treatment provided by the facility.
- The existing change in elevation from inlet to outlet is 1 ft. It may be necessary to increase this hydraulic drop to accommodate some stormwater treatment best management practices.

PERMITS REQUIRED

- Grading Permit (Lynnwood)
- ROW Permit (Lynnwood)

POTENTIAL FUNDING SOURCES

- Stormwater Financial Assistance Program, Ecology

Legend

- City limits
- Pond location (see proposed pond retrofit conceptual plan above)
- Drainage basin
- Wetland
- Stream
- Stormwater pipes
- Flow direction

Surface Water CIP 16
Golde Creek Stormwater Pond Retrofit.

0 105 210 420 Feet

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City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Street Edge Runoff Treatment Retrofits in the Hall Lake Basin

Project Number: 17 Estimated Cost: $700,000 - $1,700,000 per block
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

Nutrient, bacteria, and metals in stormwater runoff have impaired Hall Lake and downstream water bodies. Hall Lake and Hall Creek have Category 5 listings for fecal coliform bacteria impairment, and downstream Ballinger Lake has Category 5 listings for toxins and a Category 4 listing for phosphorus impairment.

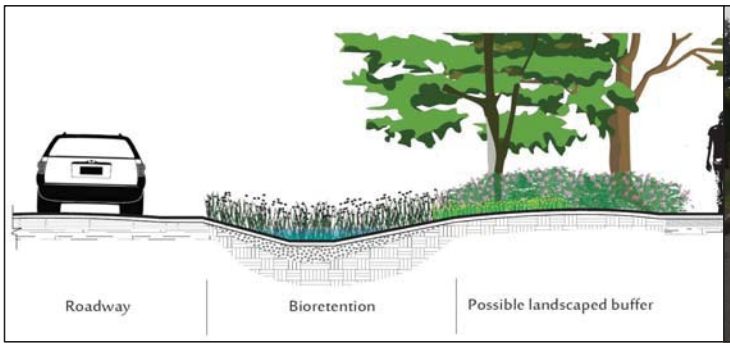
PROJECT DESCRIPTION

Retrofit residential blocks upstream of Hall Lake with roadside stormwater treatment such as bioretention or stormwater treatment planters. An efficient approach for this project would be to conduct the public participation and development of the project design basis at one time for the whole retrofit area and then implement the retrofits all at once, or block by block if necessary due to funding constraints. Relative priority of the blocks within the basin was determined based on three factors:

- Stormwater quality improvement (amount of water treated, presence of downstream treatment, street usage)
- Community benefit
- Cost (site complexity, observed utilities, longitudinal slope, large trees)

BENEFITS OF PROJECT

Enhanced runoff storage, infiltration, and pollutant removal (e.g., heavy metals, phosphorus, oil, and suspended solids).



Possible bioretention cross-section.

Wide residential streets in the Hall Lake basin.

FEASIBILITY CONSIDERATIONS

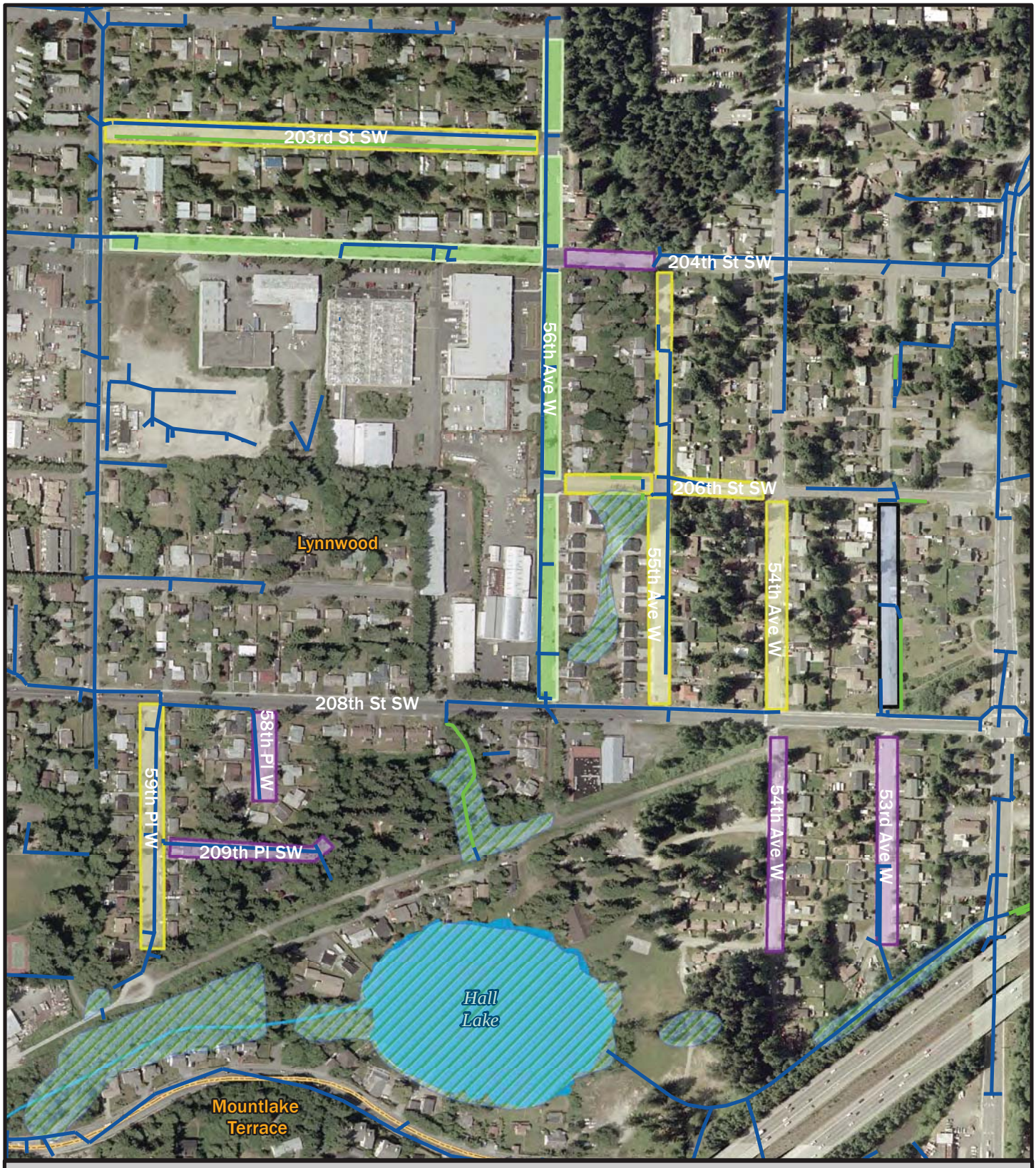
- This project may result in the reduction of pollution generating impervious surface through installation of traffic calming curb bulbs or by narrowing the street width in select locations, which may impact public acceptance. Available ROW and presence of sidewalks on both sides varies throughout the neighborhood so that some areas have greater space to accommodate bioretention facilities.
- Infiltration potential of the soils and groundwater level may limit ability to provide flow control at this location.
- Media type will be selected based on water quality concerns in Hall Lake.
- Existing utilities and trees may conflict with facility location.
- This project is near a riparian corridor so critical areas reporting may be required.

PERMITS REQUIRED

- Grading Permit (Lynnwood)
- ROW Permit (Lynnwood)

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- Centennial Grant, Washington State Department of Ecology
- Water Quality: Section 319 Grant, Ecology
- Stormwater Financial Assistance, Ecology



Legend

- City limits
- Wetland
- Lake
- Stream
- Stormwater pipes
- Stormwater channels

Retrofit priority

- Completed in 2015
- High
- Medium
- Low (infeasible)

Surface Water CIP 17
Street Edge Runoff Treatment Retrofits in the Hall Lake Basin.

N

0 200 400 800 Feet

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Engineering Construction Per-Block Cost Estimate

Project Name: **Street Edge Runoff Treatment Retrofits in the Hall Lake Basin**
Project Number: **16-06374-000**
Client: **City of Lynnwood**

QA Review

Completed/Updated By: Meghan Mullen / Matt Fontaine
Last Updated On: 2/22/2019
Reviewed By: Mary Larkin
Reviewed On: 2/20/2019
Approved By: Matt Fontaine
Approved On: 2/27/2019

High-End Cost per block [a] $ 1,000,000
Ballard Project Cost / block [b] $ 400,000

Block	Priority	Retrofit Potential	Number of blocks	Total High-End Cost ($) [a]	Total Low-End Project Cost ($) [b]
54th Ave W (208th to 206th)	Moderate	2	1.0	$ 1,000,000	$ 400,000
55th Ave W (208th to 206th)	Moderate	4	1.0	$ 1,000,000	$ 400,000
206th St SW (54th to 55th)	Moderate	3	0.5	$ 500,000	$ 200,000
206th St SW (55th to 56th)	Moderate	4	0.5	$ 500,000	$ 200,000
204th St SW (56th to 60th)	High	6	2.0	$ 2,000,000	$ 800,000
203rd St SW (55th to 60th)	Moderate	4	2.0	$ 2,000,000	$ 800,000
56th Ave W (206th to 204th)	High	5	1.0	$ 1,000,000	$ 400,000
56th Ave W (208th to 206th)	High	5	1.0	$ 1,000,000	$ 400,000
56th Ave W (204th to 203rd)	High	5	0.5	$ 500,000	$ 200,000
56th Ave W (203rd to 202nd)	High	5	0.5	$ 500,000	$ 200,000
59th Pl W (south of 208th)	Moderate	4	1.0	$ 1,000,000	$ 400,000
Subtotal Construction Cost				$ 11,000,000	$ 4,400,000
Allied Costs @ 67% (Predesign, outreach, geotech, design, permitting, City PM, CM, short term maintenance)				$ 7,370,000	$ 2,948,000
Total Estimated Cost [c]				**$ 18,400,000**	**$ 7,300,000**
Total Cost Per Block [c]				**$ 1,700,000**	**$ 700,000**

Notes.

[a] ($981,500/block) Low Impact Development Technical Guidance Manual for Puget Sound (PSAT 2005). Jan. 2005 costs updated to October 2018 using the Engineering News Record (ENR) construction cost index (CCI). Project included full street reconstruction including 1 sidewalk per block, new street paving, traffic calming design, and enhanced landscaping.

[b] ($435,500/block) Ballard Natural Drainage System Project (City of Seattle 2015). July 2015 costs updated to October 2018 using the Engieneering News Record (ENR) construction cost (CCI). Project included strategic right-of-way improvements, such as curb ramp uprgades, adjacent sidewalk upgrades and minor, local street improvements (replacement of concrete panels), landscaping updrages, silva cell detention and pit drains for flow control in addition to water quality treatment.

[c] Rounded to the nearest $100,000

Abbreviations.

LF = linear foot
SEA = Street Edge Alternative
ROW = Right of Way

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Lake Management Plan for Scriber Lake

Project Number: 22

Estimated Cost: $60,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

Scriber Lake was included on the Department of Ecology's Section 303(d) list for total phosphorus in 1996, 1998, and 2002/2004. Low levels of dissolved oxygen in the hypolimnion are also a concern. The treatment plan proposed in 2013 was not successful due to site access issues as well as other feasibility concerns associated with alum treatment.

PROJECT DESCRIPTION

Develop a Lake Management Plan to address water quality problems in Scriber Lake. The first step is to reassess the alum treatment and aeration solution proposed in 2013 with current lake water quality goals and site access constraints. Next, alternative treatment options will be evaluated and the preferred alternative will be selected. Alternative treatment options include treatment of incoming runoff and floating island wetlands. The Lake Management Plan will be prepared along with a project design that includes a site access plan.

BENEFITS OF PROJECT

The result will be a feasible plan for addressing water quality concerns in Scriber Lake.

A view across Scriber Lake from the floating platform connected to the park

Trail to access to Scriber Lake from the park

FEASIBILITY CONSIDERATIONS

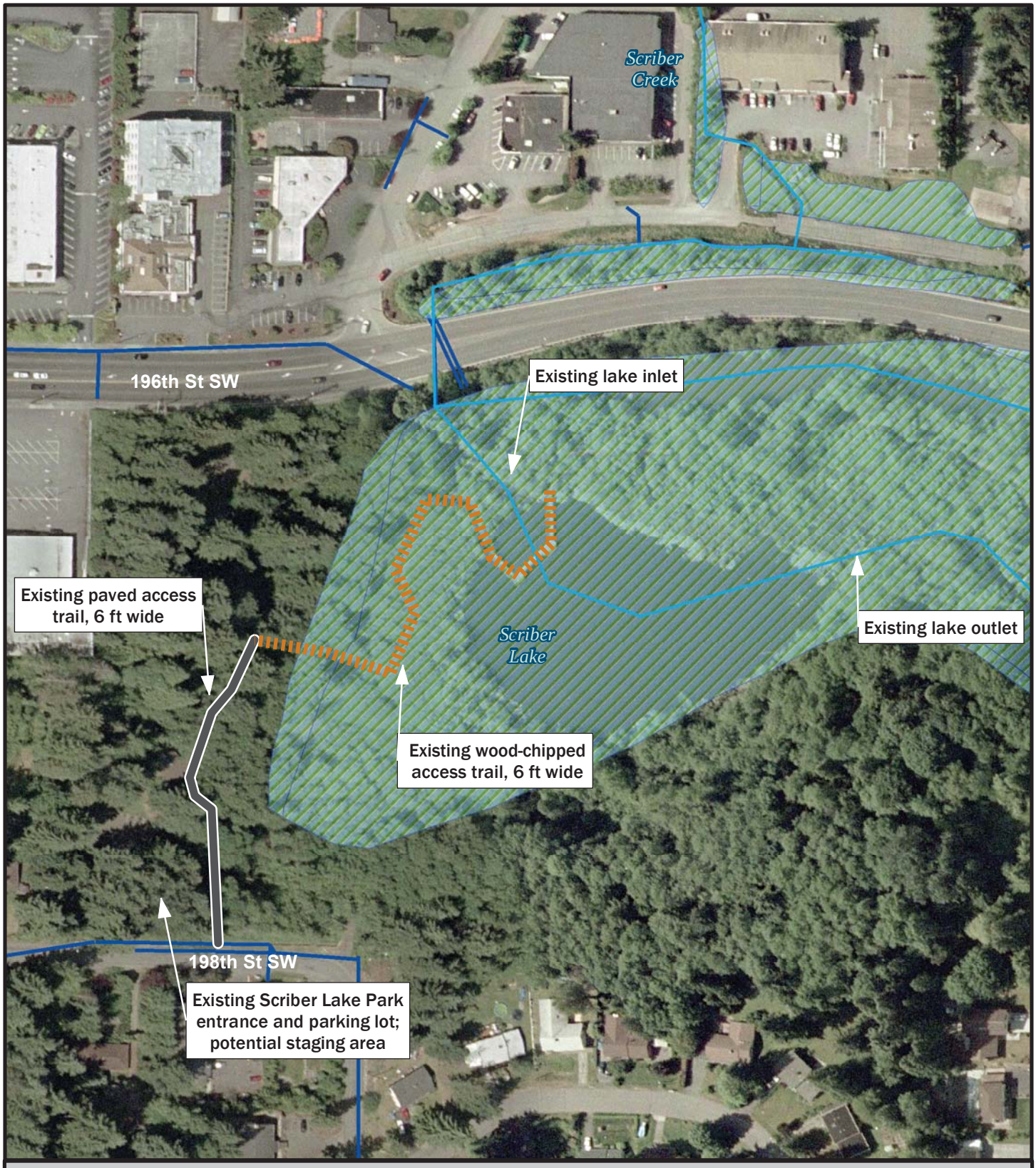
- Site access to the Lake is a primary feasibility concern (includes 6 ft. wide paved then woodchipped trails with saturated patches)
- Treatment cost and effectiveness over time
- Environmental permitting and regulations may constrain solution application
- Water quality of incoming runoff is a concern, so water treatment of 196th Street runoff may need to occur with or instead of lake treatment
- This lake management plan may be merged with an overall park restoration plan
- Implementation of the lake management plan will likely require a shoreline development permit and an algae management permit.

PERMITS REQUIRED

Not applicable

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- Freshwater Algae Control Grants Program
- Centennial Grant, Washington State Department of Ecology (Ecology)
- Water Quality: Section 319 Grant, Ecology



Legend

- Wetland
- Stream
- Stormwater pipes

Access path material

- Paved
- Woodchips

Surface Water CIP 22
Lake Management Plan for Scriber Lake.

N

0 80 160 320 Feet

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Conceptual Cost Estimate

Project Number: **16-06374-000**
Client: **City of Lynnwood**

QA Review

Completed / Updated By:	Meghan Mullen / Matt Fontaine
Last Updated On:	2/15/19
Reviewed By:	Mary Larkin
Reviewed On:	2/20/19
Approved By:	Matt Fontaine
Approved On:	2/27/19

Cost Estimate for Lake Management Plan for Scriber.	
Tasks	**Estimated Cost**
Task 1 – Project Management and Coordination	$5,000
Task 2 – Reassess Goals for Lake Water Quality and Assess the Feasibility of Alum Treatment and Aeration	$5,000
Task 3 – Conduct an Alternatives Analysis	$10,000
Task 4 – Select a Preferred Alternative and Prepare a Design	$10,000
Task 5 – Prepare the Lake Management Plan	$25,000
City Administration and Management	$5,000
Management Reserve (10%)	$6,000
Total Cost [a]	**$60,000**

[a] Cost rounded to nearest $10,000.

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: LOMC Stormwater Improvements Study and Recommendations

Project Number: 23 Estimated Cost: $40,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The Lynnwood Operations and Maintenance Center (LOMC) is an active municipal operations yard, storing numerous pieces of heavy equipment, material stockpiles, snow response materials, a decant facility, and other operational equipment. This facility has expanded in the scope of operations since it opened over 15 years ago, and a comprehensive approach to managing this expansion has never been undertaken.

PROJECT DESCRIPTION

This study should evaluate the entire LOMC site, the location(s) of the buildings, equipment storage, stockpiles, and other necessary operations and make recommendations for improvements in pollution prevention, site design, storage and operations.

BENEFITS OF PROJECT

The result of the study will be an updated stormwater pollution prevention plan and operational plan for the LOMC. The plan will improve the combined efficiency and improve environmental stewardship of the stormwater, drinking water, wastewater, and fleets operations.

City of Lynnwood Operations & Maintenance Center (LOMC)

Aerial view of the LOMC

FEASIBILITY CONSIDERATIONS

Opportunities for improving the beneficial use of this site:

- Improved pollution source control
- Enhanced sustainability
- Improved collaboration between utilities that use the LOMC

PERMITS REQUIRED

Not applicable

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- Other City utilities that will benefit from the study

Conceptual Cost Estimate

Project Number: **16-06374-000**
Client: **City of Lynnwood**

QA Review

Completed / Updated By:	Meghan Mullen / Matt Fontaine /George Iftner
Last Updated On:	6/11/19
Reviewed By:	Matt Fontaine
Reviewed On:	6/11/19
Approved By:	Matt Fontaine
Approved On:	6/11/19

Cost Estimate for LOMC Stormwater Improvements Study.	
Tasks	**Estimated Cost**
Task 1 – Project Management and Coordination	$5,000
Task 2 – Background Data Review, Site Visit, and Interviews	$5,000
Task 3 – Recommendations for Pollution Source Control, Site Design, Storage and Operations, and Concept Level Design of Stormwater Treatment BMPs	$20,000
Task 4 – Update SWPPP	$5,000
City Administration and Management	$5,000
Total Cost [a]	**$40,000**

[a] Cost rounded to two significant figures.

City of Lynnwood Surface Water Management Comprehensive Plan
Project Summary Sheet

Project Name: Stormwater Infrastructure Management Plan

Project Number: 24 Estimated Cost: $200,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

City stormwater infrastructure is aging and without a systematic approach to inspecting, rehabilitating, and replacing deteriorated infrastructure, these activities will be done in an inefficient reactive manner. The City needs to identify a preferred method of mapping infrastructure, filling data gaps, conducting conditions assessments, and prioritizing repair and replacement projects.

PROJECT DESCRIPTION

Develop a work plan that the City can follow to properly map and manage their stormwater infrastructure as a systematic, progressive, and prioritized program for rehabilitating or replacing infrastructure as it reaches the end of its design life. The plan will spread out and normalize capital infrastructure replacement expenditures over time. The plan will include the following phases:

- Identify and discuss existing mapping schema and data uses, identify a new mapping schema, and identify critical data needs.
- Address critical data gaps and implement the new mapping schema.
- Identify preferred approach for assessment of infrastructure condition (i.e., in-house versus contractor)
- Document the plan for condition assessment, map updates, and prioritizing and funding rehabilitation and replacement.

BENEFITS OF PROJECT

- Prolonging asset life and aiding in rehabilitation, repair and replacement through efficient and focused operation and maintenance
- Helping to meet some NPDES regulatory requirements, including mapping requirements and IDDE reporting requirements
- Increasing knowledge of system mapping and infrastructure characteristics can improve emergency response, such as response to spills.

FEASIBILITY CONSIDERATIONS

- Develop project phases to best utilize available budget
- Meeting level of service with a focus on sustainable operation
- Setting utility rates based on sound operational and financial planning
- Budgeting focused on activities central to sustained performance
- Meeting service expectations of the community, rather than waiting for a system failure
- Realistic timeline for project implementation
- Consider software in the development of the new mapping schema

PERMITS REQUIRED

Not applicable

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund

Conceptual Cost Estimate

Project Number: **16-06374-000**
Client: **City of Lynnwood**

QA Review

Completed / Updated By:	Meghan Mullen / Matt Fontaine
Last Updated On:	2/15/19
Reviewed By:	Mary Larkin
Reviewed On:	2/20/19
Approved By:	Matt Fontaine
Approved On:	2/27/19

Cost Estimate for Stormwater Infrastructure Management Plan	
Tasks	**Estimated Cost**
Task 1 – Project Management	$30,000
Task 2 – Define Mapping Schema and Identify Critical Data Needs	$15,000
Task 3 – Integrate Schema and Collect Critical Data	$60,000
Task 4 – Identify Preferred Approach for Conditions Assessment	$10,000
Task 5 – Document Stormwater Infrastructure Management Plan	$15,000
City Administration and Management	$20,000
Management Reserve (30%)	$50,000
Total Cost [a]	**$200,000**

[a] Cost rounded to nearest $10,000.

Work Breakdown Structure for Stormwater Infrastructure Management Plan	
Tasks	**Estimated Cost**
Task 1 - Project Management	**Subtask Cost**
Weekly team coordination meetings	$5,000
Monthly progress reports	$5,000
Monthly invoices	$10,000
Bi-weekly PM check-ins	$5,000
Change and risk management	$5,000
Task 1 Total	**$30,000**
Task 2 – Define Mapping Schema and Identify Critical Data Needs	
Identify and discuss existing data uses, gaps, and needs	$4,000
Determine the current schema while considering possible software options	$3,000
Identify a new schema	$5,000
Identify existing and future critical data needs	$3,000
Task 2 Total	**$15,000**
Task 3 – Integrate Schema and Collect Critical Data	
Convert existing data to the new schema (informed allowance)	$30,000
QA and fill in critical missing data (informed allowance)	$30,000
Task 3 Total	**$60,000**
Task 4 –Alternatives Analysis of Conditions Assessment Strategies	
Alternatives analysis	$4,000
Draft alternatives analysis technical memorandum	$2,000
Final alternatives analysis technical memorandum	$4,000
Task 4 Total	**$10,000**
Task 5 – Document Stormwater Infrastructure Management Plan	
Consider possible prioritization schemes for infrastructure	$5,000
Develop a schedule to assess the condition of all infrastructure in the city	$5,000
Develop a funding plan to assess infrastructure condition and repair / replace infrastructure as needed	$5,000
Task 5 Total	**$15,000**

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Annual System Rehabilitation and Replacement

Project Number: 25

Estimated Cost: $100,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The City must routinely replace deteriorated elements of the stormwater system. In the past, the City had a catch basin repair and replacement program to replace risers, remud basins, line basins, and replace some basins.

PROJECT DESCRIPTION

Annual funding up to $30,000 per project will be provided within the capital plan for routine infrastructure replacement for investing in identified system-wide improvement needs.

BENEFITS OF PROJECT

Provides flexibility for addressing smaller aging infrastructure issues outside of large-scale CIP projects

FEASIBILITY CONSIDERATIONS

- Coordination with projects conducted by other utilities should be considered to increase efficiency.

PERMITS REQUIRED

Many stormwater system components are near streams, wetlands, and geologically hazardous areas. Projects need to confirm that critical areas and buffers are not affected prior to execution.

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: Funding for Strategic Opportunities to Improve the Stormwater Management Program

Project Number: 26 Estimated Cost: $100,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

Development within the City frequently provides time-sensitive opportunities to improve the stormwater management system without identified budgetary sources. City Strategic Opportunity Projects include funding for infrastructure investment such as property acquisition for future surface water management projects or partnering opportunities that arise, often requiring relatively quick funding decisions to leverage the City's limited funds. For example, the stream culvert at 200th Street needs replacement. There may be opportunities to partner with future Sound Transit development for this improvement.

PROJECT DESCRIPTION

Annual funding up to $100,000 will be set aside for adding stormwater improvements to non-stormwater projects driven by other agencies, jurisdictions, or private development. These projects include to partnerships with other jurisdictions or private developers, property acquisition for future projects, or participation in limited-time services or events. When the Surface Water Utility does provide financial support on non-stormwater projects, it shall be considered a project partner, and involved in a collaborative way to provide input on project delivery via the process defined under other work (see Policy #2 Issue Paper).

BENEFITS OF PROJECT

This fund will enable the stormwater utility to improve the stormwater system and the Stormwater Management Program, or develop and implement individual stormwater CIP projects, without having to borrow money from other projects.

Scriber Creek Downstream of the 200th Street SW intersection

FEASIBILITY CONSIDERATIONS

- Development that triggers street improvements
- Coordination with partner agencies
- The following are potential examples of projects where Surface Water Utility funds could be justified:
  - Project offers an opportunity to correct a storm water system deficiency (reconstruction/rehabilitation)
  - Project offers a cost-effective opportunity to upgrade or replace aging stormwater facilities (retrofit)
  - Project offers the opportunity to provide additional benefits to the surface water system which are aligned with the Surface Water Utility's goals and objectives such as retrofitting for stormwater quality, flood control, or habitat restoration

PERMITS REQUIRED

Not applicable

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund

City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: 44th Avenue Flood Notification Signage

Project Number: 27

Estimated Cost: $180,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

44th Avenue will continue to experience flooding until Phase 2 of the roadway improvement project is completed in 5 to 10 years. The flooding creates a hazard for motorists.

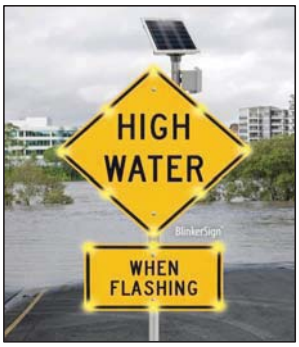
PROJECT DESCRIPTION

Install multiple variable message signs that warn motorists of flooded roadway conditions on 44th Avenue W at Scriber Creek by notifying them of "Use Caution; Water Over Roadway" and "Road Closed".

BENEFITS OF PROJECT

This sign will improve public safety with a rapid response sign board capable of being activated when flood water extends into the traveled roadway and deactivated when flood conditions recede.

Ponded water at the low point of 44th Avenue W.



Example flashing sign to indicate water over roadway.

FEASIBILITY CONSIDERATIONS

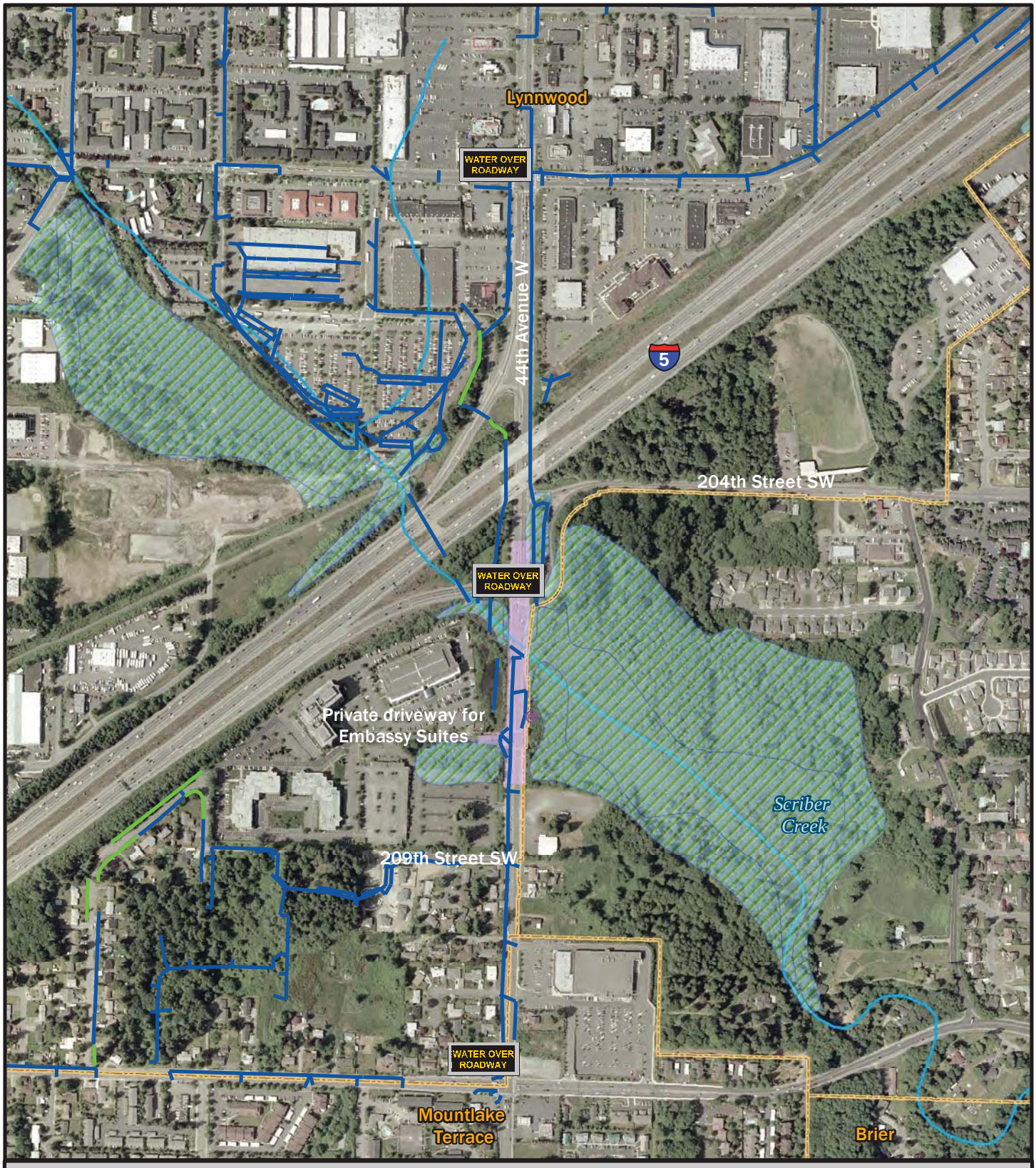
- The float switches on the existing stormwater pump station may be an option for activating the sign.
- Signs likely located outside of WSDOT limited access right of way and wetland buffer.
- Potential coordination may be needed with WSDOT for an additional sign on the off-ramp to give motorists warning not to turn right.
- The best sign location that allows motorists to find an alternate route driving north may require interlocal coordination with Mountlake Terrace.
- Signs may need capability to be remotely controlled.
- Signs may require battery backup if power is lost.

PERMITS REQUIRED

Not applicable

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund



Legend

- City limits
- Area of road impacted by flood events
- Wetland
- WATER OVER ROADWAY — Proposed sign locations
- Approximate stormwater pump station location
- Stream
- Stormwater channels
- Stormwater pipes

Surface Water CIP 27
44th Avenue Flood Notification Signage.

N

0 300 600 1,200 Feet

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Engineering Construction Cost Estimate for Conceptual Design

Project Name: **44th Avenue Flood Notification Signage**
Project Number: **16-06374-000**
Client: **City of Lynnwood**

QA Review

Completed/Updated By: Meghan Mullen / Matt Fontaine
Last Updated On: 2/15/2019
Reviewed By: Mary Larkin
Reviewed On: 2/20/2019
Approved By: Matt Fontaine
Approved On: 2/27/2019

Item No.	Spec Division	Item Description	Qty	Unit	Unit Cost	Total Cost
	Div 1	**General Requirements**				
1		Mobilization	1	L.S.	10%	$ 7,490
2		Erosion/Water Pollution Control	1	L.S.	1%	$ 700
3		Utility Protection and Relocation	1	L.S.	1%	$ 700
4		Project Temporary Traffic Control	2	L.S.	5%	$ 3,500
	Div 8	**Miscellaneous Construction**				
5		Signs, Poles, Telemetry, Installation	1	L.S.	$ 50,000	$ 50,000
6		Power	1	Est.	$ 20,000	$ 20,000
		Construction Subtotal				**$ 82,390**
		Contingency	30%			**$ 24,717**
		Subtotal (with +30% Contingency)				**$ 107,107**
		Tax	8.5%			**$ 9,104**
		Construction Total (with Contingency and Tax)				**$ 116,211**
		Design (Prelim and Final)	30%			$ 34,863
		Permitting				$ 5,000
		Construction management	10%			$ 11,621
		City Project Management	10%			$ 11,621
		Estimated Project Total (rounded to 2 significant figures)				**$ 180,000**

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City of Lynnwood Surface Water Management Comprehensive Plan Project Summary Sheet

Project Name: 44th Avenue W. roadway raising at Scriber Creek crossing (Phase 2)

Project Number: 28 Estimated Cost: $14,000,000
ENR CCI 11,185.51 (December 2018)

PROBLEM DESCRIPTION

The existing roadway has experienced substantial settlement due to poor underlying soils. Sediment accumulation in Scriber Creek has resulted in a higher creek profile. As a result, roadway flooding occurs during high storm events and is expected to increase in frequency as roadway settlement and creek siltation continues. The Scriber Creek Culvert was replaced during Phase 1 of this project. Now, the road elevation needs to be raised as Phase 2 of the project.

PROJECT DESCRIPTION

The project will raise approximately 1,000 lf of 44th Avenue W between the I-5 underpass and 209th St. SW. The potential design may include structural slabs on top of pin piles, pile caps, and grade beams to create a stable roadway that will not settle. The new roadway will be raised from its current elevation to prevent future flooding. The driveway south of the crossing will be raised with the road. The estimated cost assumes the elevated roadway is 1,000 ft long and 70 ft wide with a unit cost of $118 per sq. ft. which is based on the unit cost for the Maple Rd / Ash Way intersection and drainage improvements project plus a 30% contingency and 50% allied costs (Preliminary Design, Geotechnical Survey, Final Design, Permitting, Construction Management, City Administration, and mitigation for floodplain filling).

BENEFITS OF PROJECT

Reduces road closures due to flooding and improves safety. Increasing drainage capacity will also reduce fish passage barriers and reduce upstream flooding.

Ponded water at the low point of 44th Avenue W.

Inlet of Scriber Creek culvert under 44th Avenue W.

FEASIBILITY CONSIDERATIONS

- Fish passage should be considered for the existing culvert.
- Easements or vertical transition may be needed to address the driveway located at the low point of the project area.
- The pipe system to the southwest may flood even if the road is raised.
- Long term settlement of the road is predicted to be 1.5 to 2 ft over 20/30 years.
- This large project warrants preliminary design to evaluate geotechnical characteristics, verify flood elevation, and define the type, size, location, and cost of the future roadway.
- Raising the roadway will involve filling in a mapped floodplain so mitigation will be required.

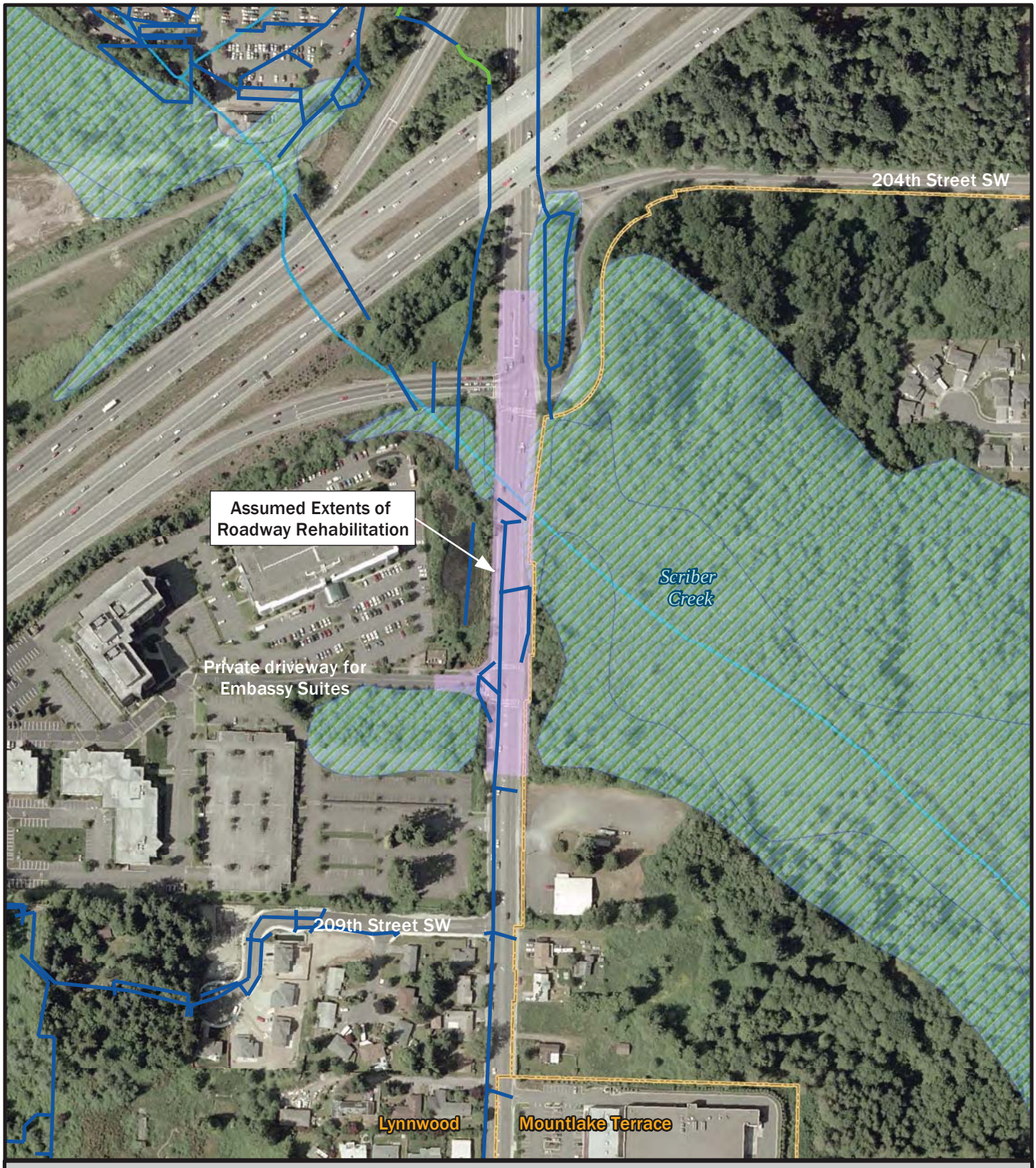
PERMITS REQUIRED

To be determined, but could include:

- CWA Section 404 (USACE)
- CWA Section 401 (Ecology)
- Hydraulic Project Approval (WDFW)
- SEPA DNS or MDNS (Lynnwood)
- Grading Permit (Lynnwood)
- Critical Areas Permit with mitigation (Lynnwood)
- ROW Permit (Lynnwood)

POTENTIAL FUNDING SOURCES

- City of Lynnwood Surface Water Utility Fund
- City of Lynnwood Streets Funding
- Highway Safety Improvement Program
- Public Works Board Construction Loan Program
- Community Economic Revitalization Board
- Transportation Improvement Board Urban Arterial Program



Legend

- City limits
- Assumed extents of roadway rehabilitation
- Wetland
- Stream
- Stormwater channels
- Stormwater pipes

Surface Water CIP 28
44th Avenue W Roadway Raising at Scriber Creek.

N

0 150 300 600 Feet

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